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Vol. CXXVIII. No. 3303 MARCH 14, 1941 SIXPENCE

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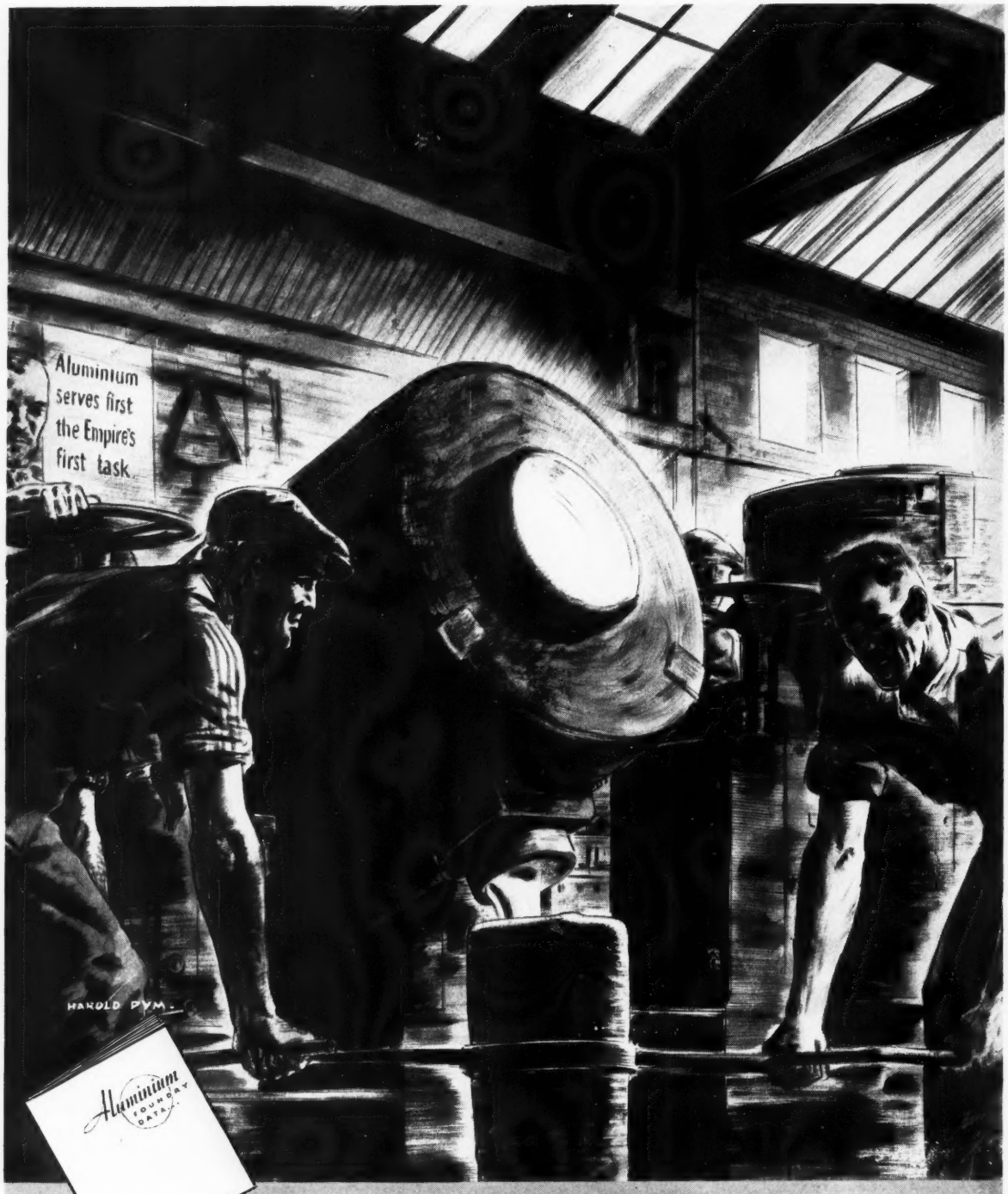

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THE
ELECTRICAL REVIEW

Volume CXXVIII — No. 3303

Friday, March 14th, 1941

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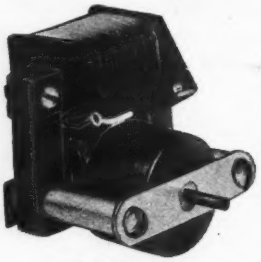

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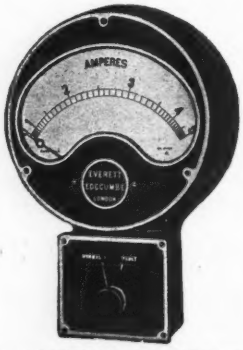

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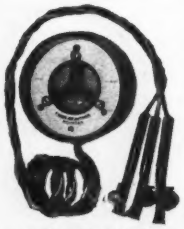

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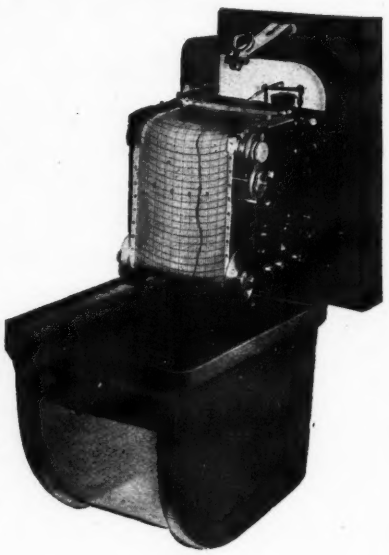

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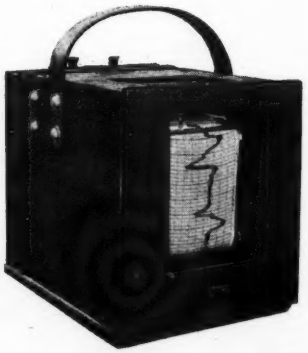

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THE
ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXVIII. No. 3303 MARCH 14, 1941 Price SIXPENCE

Industrial Concentration

Improvement of the "Load Factor"

SINCE the war started many decisions affecting industry have been taken by the Government, but we think that none of them has caused more concern than that announced by the President of the Board of Trade last week.

The commandeering of men, machines and materials has gone on without fundamentally altering the industrial structure, but the decision to close down large sections of certain trades is likely to have far-reaching effects—now and also after the war—in spite of the declared intention of the Government to see that closed factories are restarted when peace is concluded.

Uneconomical Working

Let us remember, however, that the idea is not an entirely new one. It has already been applied in the textile, shipbuilding and coal industries, when displaced firms were compensated by means of a levy on the survivors. The principle is sound enough. If there is insufficient work to go round the existence of too many productive units is uneconomical and harmful to the whole of the industry concerned. It has led in the past to price-cutting and the evil of part-time employment.

In these days, pressed as we are for man power, it is criminal that there should be any part-time working or wasted capacity and it is the elimination of this that the Government is aiming at. The broad statement of policy made by the President of the Board of Trade is reported on another page. At a conference with the trade Press last week Mr. Lyttelton amplified and supplemented this statement.

He said that one of the most urgent needs of the moment was for skilled and experienced managerial and supervisory workers and it was hoped that the principal effect of the new plan would be to release many such men for more vital work. Mr. Lyttelton admitted that the scheme was at present in nebulous form; it was left to the industries concerned to put it into solid shape. All that the Board of Trade had been able to do was to indicate the requirements. If firms in any industry were unwilling or unable to conform, to the satisfaction of the Board, the latter possessed means of compelling them to do so. The weapon which it wields, in conjunction with the Ministries of Labour and Supply, is the control of men and materials.

Recalcitrants, it was hinted, would find that difficulties would arise in both these directions, but it is to be hoped that this power will not be used until the Board, through the Industrial and Export Council (as the enlarged body is now called) has made every endeavour to assist firms to arrive at an agreed scheme. On the other hand the "nucleus" firms are to be granted certificates by the Board which will ensure for them freedom from interference with their labour force and a flow of materials as steady as circumstances permit. Certificates will also be granted to any firm which can show that it is operating at a satisfactory ratio of production to capacity or to one of a pair of firms (or more) if they can arrive at a satisfactory arrangement between themselves.

Maintaining Goodwill

Mr. Lyttelton promised that the Government would do all that it could to preserve the goodwill and trade-marks of firms temporarily put out of action and help them to restart after the war. In reply to questions, he said this meant that they would be allowed to maintain some form of sales organisation, but that their distributive arrangements would have to be curtailed considerably. It is to be presumed from this that the customary ways of keeping particular makes of goods before the public will be permitted, so far as funds for the purpose are available.

How the electrical industry will be affected is far from clear. Practically all electrical manufacturers are, of course, subject to the operation of the Limitation of Supplies Order or material control, or both. But a great many of them are engineering concerns and as such are already engaged in work of national importance, often in fields other than their normal ones. It cannot, we think, be the intention of the Board of

Trade to interfere with the operation of such concerns. The matter is one which will largely concern the trade associations but in this connection Mr. Lyttelton mentioned that there were hundreds of small firms which were not members of any trade organisation. It was not intended to force them into amalgamations with large concerns. In dealing with these, he said, he relied on the help of the trade Press to make known to these firms the progress of the scheme and to give them guidance in conforming to the Government's wishes. For our part, we gladly place our services at our readers' disposal and would welcome their views to enable us to carry out these functions.

Diesel Developments

IN the Cantor Lecture to the Royal Society of Arts, Professor S. J. Davies referred to the generation of electricity in emergency, or for meeting peaks, or for distribution in districts not yet reached by the grid as providing extending spheres of utility for the oil engine. The reputation for reliability that has been earned by this form of prime mover is demonstrated by the application of automatic unattended operation to units of increasingly greater capacity. Similar reasons offer growing scope for the export of oil engines which, as Professor Davies points out, adds to the national engineering prestige in addition to bringing foreign exchange. The urgency of the need for the latter is temporary, but the ability to meet it is due to sound work over long years.

Electric Ships

DISCUSSING marine propulsion, Professor Davies considers Diesel-electric propulsion more especially suitable to small vessels when ability to manœuvre quickly is essential; the propeller can be controlled direct from the bridge and only one man is needed below deck. Support is given to this view by data included in the Thomas Lowe Gray Lecture delivered by Dr. S. F. Davy before the Institution of Mechanical Engineers. The seventy-four Diesel-electric ships registered have an aggregate gross tonnage of 190,000, whereas for the forty-four with turbo-electric drive the figure reaches 496,000, giving an average of about 2,500 tons in the first case and 11,200 in the second, which includes five passenger liners of over 20,000 tons. In the present circumstances, as Mr. A. Regnauld showed in our issue of January 24th, electric propulsion offers advantages in permitting constructional methods that should expedite the output of vessels of all kinds.

Power Engineers' Salaries

THE Electrical Power Engineers' Association recently asked the Stockton-on-Tees Corporation to observe the conditions of the National Joint Board Schedule in respect of the Corporation's mains superintendent and assistant mains superintendent. The Corporation declined to do this but agreed to the submission of the matter to the Industrial Court. In the course of the proceedings before the Court the Corporation made some curious submissions. One was that as the claimants were not workmen the Court had no jurisdiction, although, as stated above, the Corporation had agreed to the submission of the case to the Court. The other point was that as the employers represented on the National Board were not an "organisation" the provisions of the Conditions of Employment and National Arbitration Order were not applicable. We are glad to see that the Industrial Court ignored these quibbles and ruled in favour of the Association and its two members. The E.P.E.A. points out that the award has already had repercussions in two other cases in which local authority undertakings were unwilling to adopt the Schedule.

Shift Engineers' Grievances

FOR a very considerable time the E.P.E.A. has had under consideration the position of its shift charge engineer members. At present these men are covered by Grade 8 of the National Joint Board Schedule; the general contention is that they should be "promoted" to Grade 7 with its higher salaries. Some of those concerned, however, maintain that hours, not pay, are the first consideration and they fear that if re-grading is approved their hours will remain as they are. The representatives of the Association on the National Joint Board have been authorised to raise the matter again, and the *Electrical Power Engineer* hints at going further if the proposals are rejected, although, it is said, the Association is reluctant to go to the extreme of invoking the assistance of an outside tribunal.

Electricity Supply Dividends

THE dividend declarations of the leading electricity supply companies are generally conforming to anticipations; that is, the London companies have had to curtail their distributions while the provincial concerns have managed to maintain them. The Northmet Co., in spite of its widespread and varied area has followed the practice of the other London companies. There are exceptions to the rule: for instance, the Mid-Southern Utility Co., while paying the same dividend on its "C" stock, has reduced the payment on the "A" and "B" stocks, and the Bournemouth and Poole Co.'s ordinary dividend is lowered. On the other hand, the Richmond (Surrey) undertaking, a sister company which operates in what is practically a part of the London area, has declared the same dividend as for 1939. The North Wales Power Co. and its parent the British Power and Light Corporation have also lowered their distributions.

Paying for Safety

TWENTY years or so ago, before researches into earthing problems had come to disturb equanimity on the subject, no very elaborate measures were considered necessary for dealing with leakage currents and voltages. From the safety standpoint it was a case of equating ignorance with a bliss that derived from a paradise of non-rational beings. Nowadays, no doubt partly due to the spread of electricity to rural areas, it is clear that the cost of obtaining a satisfactory earth may amount to a widely varying, and possibly substantial, proportion of the whole cost of a small installation. This was one of a number of points brought out in Dr. H. G. Taylor's lecture to the A.S.E.E. last week, which showed in several ways how far from finality is earthing practice. As the expense of providing adequate protection from shock goes up extremely rapidly as the resistivity of the soil increases, it imposes the necessity of allowing ample margin for earthing, based on local conditions, in estimates for installation work—an item that is not, we believe, always fully appreciated.

Modern Factory Distribution

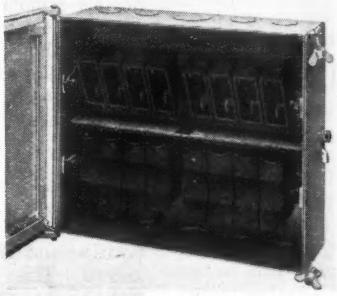
H.r.c. Fuses and Overhead Busbars

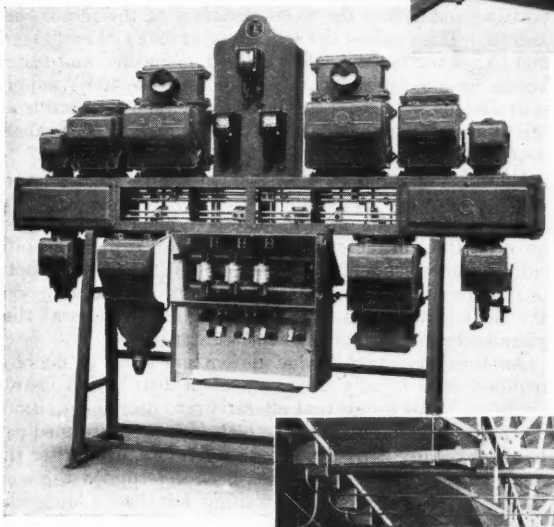
By H. Simmonds

TWO outstanding developments of recent years in factory distribution are a large increase in the use of apparatus containing high-rupturing-capacity fuses and the introduction of overhead busbar systems. Interference with production can be greatly reduced if the circuit protective devices operate so as to isolate faulty circuits only. The requisite discrimination can be obtained by the use of h.r.c. fuses of correct design. This applies to lighting as well as to power circuits.

The author discusses methods of obtaining reliable discriminative protection and flexibility in lay-out to facilitate extensions or alterations in the positions of machinery*

High-rupturing-capacity fuses should be installed in the outgoing air-break fuse switch units on the 400-V board in the transformer substation, in the fuse-switch units on sub-circuit boards and in the distribution fuse boards or plug-in fuse boxes on the overhead busbar system feeding individual motor circuits. The discriminating properties of h.r.c. fuses are shown by the calibration fusing time/current curves of different current ratings, which continue to run parallel to each other right down to very short-time values. In addition, as these fuses are non-deteriorating, their characteristics are retained throughout their life, the only attention required being the routine maintenance of the contacts of the apparatus in which they are incorporated.





Above: H.r.c. fuse distribution board for lighting circuits. Boards incorporating circuit switches are available. Left: Typical metalclad air-break "combination" fuse-switch board. Individual units are available in ratings from 30 A to 750 A

Typical overhead busbar installation. The runs of overhead busbar with fuse boxes feeding two lines of machine tools are seen on the top left and top right

Such discrimination cannot be relied upon when rewirable fuses or circuit-breakers are used. The former deteriorate and in modern factory systems the fault kVA is usually in excess of the value that they can safely deal with. Theoretically, discrimination can be obtained with circuit breakers, provided the overload trips are fitted with time lags having different time-delay settings. In practice, however, it is rarely possible in a factory installation to maintain the circuit-breakers and their time lags in the perfect condition necessary.

High-rupturing-capacity fuses also give efficient back-up protection to motor starters. It is standard practice for motor starters to be fitted with overload trips and low-voltage releases, but the rupturing capacity does not usually exceed a figure equivalent to six times the full-load current of the motor. If a severe short circuit occurs on a motor circuit, h.r.c. fuses protecting it will clear before the starter contacts open, thereby saving the starter from damage. On overload the motor circuit is opened by the functioning of the overload trips on the motor starter and the fuses should be unaffected. The machine operator can then, after removing the

* Mr. Simmonds is in the Fusegear Sales Technical Department of the English Electric Co., Ltd.

cause of the overload, reclose the starter, and proceed with production with the minimum loss of time.

If fuses are blown on overload, the electrician has to be called and this involves a longer time of shut-down as well as the cost of fuse replacements. It is usual, therefore, to rate h.r.c. fuses for a given horse-power of motor so that they do not operate on overloads within the capacity of the starter and are also able to withstand starting currents. Tables of recommended ratings are published by the fuse manufacturers.

Overhead Distribution

The overhead busbar system is particularly suited to factories containing machines with individual motor drives which are situated in lines and at close spacing, such as machine-tool shops. Overhead busbar runs are normally supported by the roof members, and the tap-off connections drop down from plug-in fuse boxes to the motor starters, which are either attached to the machines or located immediately alongside.

Bare copper busbars in a metalclad housing are not recommended. In a paper entitled " Destructive Voltage Rise on L. T. Busbars " by H. P. McGraw, published in the *I.E.E. Journal* of May, 1933, the author shows how a voltage surge of sufficient magnitude to cause a flashover can be produced when *uninsulated* busbars of an appreciable length are supported by equally spaced insulators.

Present designs originated in conditions that obtained in the motor car industry after the last war, when improved models were being introduced each year. The production programme for each new model called for a revised layout of machine tools. For instance, the number of cars to be produced might have increased, requiring additional machine tools, or improved designs of machine tools might have been introduced to lower production costs. With the methods of electrical distribution then in use, *i.e.*, stanchion or wall-mounted fused distribution boards with the cabling to the motors buried in the floor, frequent alteration to machine-tool layouts presented a serious problem to factory engineers.

Moreover, the change-over to the new layout had to be carried out rapidly so as to avoid delay in starting production on the new model. This usually meant a resort to temporary connections which tended to remain permanent owing to the difficulty of arranging a further shut-down after production on the new model had commenced. A flexible method of rapidly changing over when the machines had to be moved to new positions was provided by the introduction of the overhead busbar system.

Methods of Carrying Busbars

The system is usually installed in single-storey buildings with roofs giving a north light. Where possible the machine-tool layout should be arranged so that the overhead busbars run at right angles to the roof trusses, in which case they can be laid on top of the horizontal members. The overhead busbar is usually anchored to the roof trusses by means of simple clamps which can be made and fitted at site. If the spans are less than the length of the standard sections, the busbars can be laid across the roof trusses preparatory to coupling the sections together. If spans exceed that length, then a series of planks should be laid across the roof trusses, and the sections laid on the planks, after which they can be coupled up in their final position, one at a time. Before connecting the fish plates, the insulating tubes for the end sections should be assembled.

If the overhead busbars have to run parallel to the roof trusses, or if the ceiling is flat, supporting brackets must be provided to carry them. Alternatively, U-shaped brackets can be erected in advance, after which the sections can be laid in position and connected up as in the case of direct laying on the roof trusses. Occasionally overhead busbars are required to be connected at right angles to the main run. For such connections an incoming adaptor housing should be fitted on the main run and another on the run at right angles.

Interconnections should consist of v.i.r. single-core taped and braided cables in flexible metallic tubing. Such an arrangement takes care of discrepancies in the roof members to which the overhead busbar is fixed, and is much better than rigid tee or angle connectors with which lining-up difficulties would almost certainly occur.

Connections from plug-in fuse boxes to motor starters can take three forms. The first two consist of v.i.r. single-core taped and braided cables, one in heavy-gauge welded or solid-drawn steel conduit and the other in flexible metallic tubing. In the third case v.i.r., c.t.s. cable with flexible metallic armouring is employed. The first method is the one most extensively used, mainly because both v.i.r. cable and conduit are readily obtainable. Furthermore, horizontal runs are more easily supported than when flexible cables are used. Earth continuity is obtained by means of the steel conduit.

The second and third methods require a separate earth conductor, as neither the flexible metallic tubing nor the flexible armouring is suitable as an earth conductor. If machines are to be frequently moved, then the second and third methods can be used to advantage provided spare cable is allowed. It is, however, an easy matter with the first method to extend or shorten the conduit and the v.i.r. cables when the positions of the machines have to be changed.

Installation in Advance

A notable advantage of the overhead busbar system is that runs can be erected as soon as the roof steelwork is in position and before the exact positions of the motors are known. This enables the contractor to make an early start and to get the feeding cables erected, connected and tested before the machines arrive. As soon as the 400-V supply is available the busbars can be energised and afterwards all tap-off connections can be made without making the busbars dead.

One of the troubles with the older methods of power distribution was that so much work had to be left until the final positions of the machines had been determined. Consequently, the contractor had a last-minute rush. Theoretically, a factory should be planned so that the final positions of machines are known in advance. In practice, however, the final layout of machines is seldom the same as that visualised when the cabling contract was placed.

Another advantage is that no cutting away of floors is required as is usually necessary when distribution boards are used. This means that alterations to machine positions during installation or after the factory is commissioned can be more readily carried out. Furthermore, even after the final position of a machine has been determined the contractor is often delayed by waiting for the builder, who usually cuts the floor chases.

The plug-in fuse boxes can be inserted or withdrawn with the busbars " alive." New machines can be connected up during normal working hours without interfering with the supply to the machines already in commission.

Finally, overhead busbar systems of unit construction are completely re-usable. Therefore, if the arrangement of busbar runs is revised or, if the equipment has to be transferred to new premises, both material and labour costs are kept to a minimum.

I.E.E. Liverpool Centre

THE following arrangements have been made for meetings of the Mersey and North Wales (Liverpool) Centre of the Institution of Electrical Engineers :—March 17th at 5.30 p.m., at Liverpool Royal Institution : " The Trolley Bus," by Mr. G. F. Sinclair. April 21st (time to be announced later) : Annual general meeting and four ten-minute papers by local members.

It is intended to hold a meeting on a date in May not yet fixed, at Chester, at which it is hoped to present a paper from those submitted to the Transmission Section.

PERSONAL and SOCIAL

News of Men and Women of the Industry

IT is announced that **Mr. Frank Parkinson** Chairman of Crompton Parkinson, Ltd., the British Electric Transformer Co., Ltd., Derby Cables, Ltd., and other companies, has been given leave of absence from his executive positions in these companies to enable him to devote his whole time to the duties of Deputy Director-General of Contracts to the Ministry of Supply. Mr. Parkinson will retain his seat on the boards of these companies.

Mr. H. A. Gray, who has been with the Manchester Electricity Department for many years, has been elected president of the Electrical Power Engineers' Association in succession to Mr. G. Gunn, A.M.I.E.E. Mr. P. L. Weir, of Portsmouth, the senior vice-president, found himself unable to take up the presidency, but he has been designated president-elect. The new vice-presidents are **Messrs. E. Laming,** charge engineer to the London Passenger Transport Board, and **J. C. Welburn,** chief draughtsman to the Harrogate Corporation Electricity Department.

Mr. H. A. Gray

Mr. E. Dyson, who has been appointed superintendent engineer to the Stalybridge, Hyde, Mossley & Dukinfield Joint Transport Board, was at one time in the employ of the Huddersfield Corporation Transport Department. Mr. Dyson, who is now maintenance superintendent to the South Shields Corporation Transport Department, went some years ago to Rangoon to supervise a complete overhaul of the city's passenger transport system.

Mr. C. H. Luke, F.R.S.A. has been elected a director of the Superheater Co., Ltd.

Mr. R. C. Gordon informs us that he is shortly leaving the Islington Borough Electricity Department, with whom he is at present engaged as senior assistant in the wiring and installations department, to take up a commission as sub-lieutenant (E.) in the R.N.V.R. Before going to Islington in 1936, Mr. Gordon was consumers' engineer with the East Grinstead electricity undertaking.

Mr. J. W. Davis has relinquished his position as sales engineer, North-East area, with the Benjamin Electric, Ltd., to take up duties with the British Thomson-Houston Co., Ltd., at that company's Newcastle-on-Tyne branch.

Mr. C. S. Bell has retired from the board of Turner & Newall, Ltd.

Mr. J. Fraser, assistant superintendent of telegraphs and telephones at Inverness P.O., received a gift from the staff on the occasion of his departure for Edinburgh G.P.O. where he has been appointed assistant traffic superintendent (telegraphs).

Hull Corporation Electricity Committee reports the resignation of **Mr. S. Hutton,** assistant shift engineer.

The General Purposes Committee of the Borough of Brentford and Chiswick has confirmed the following appointments in the electricity undertaking :—Mr. F. J. Chapple, consumers' engineer ; Mr. S. Ford, mains superintendent ; Messrs. E. P. Vesey and R. M. E. Blake, mains assistants. Messrs. W. E. A. Stinton, L. S. Kelway, W. A. Ward and D. Griffith have been regraded as station charge-engineers. All the salaries are in accordance with the appropriate N.J.B. scale. Mr. G. Darlow, station foreman, will retire on March 31st after more than forty years' service with the undertaking.

Mr. C. E. H. Verity, technical engineer to the London Power Co., Ltd., has been temporarily seconded for special duty with the Air Ministry.

Mr. S. Barnett has been appointed lecturer in electrical engineering at Constantine Technical College by the Middlesbrough Education Committee.

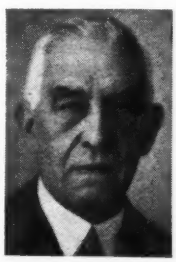
Mr. C. L. C. Allan, B.A.(Hons.), A.M.I.E.E., assistant section engineer with the Central Electricity Board in the South London Section of the South-East England Area for the past three years, has been appointed assistant mains superintendent to the Ipswich Corporation Electric Supply and Transport Department.

Mr. C. Heathcock, F.C.I.S., managing director of the Midland Electric Corporation for Power Distribution, Ltd., has been elected vice-chairman of the West Midlands J.E.A., in the place of Alderman J. H. Willis, who died in January.

Mr. F. J. Crowle, who has retired after twenty-eight years' service with the British Engine, Boiler & Electrical Insurance Co., Ltd., has been presented with a fitted wardrobe and a card table ; Mrs. Crowle was presented with a handbag. The presentation was made by the manager, Mr. W. Eddy. Mr. Crowle joined the company as district electrical surveyor in Plymouth, and has been in Bristol for the past twenty-seven years.

Mr. G. A. Vandervoort has been appointed chief engineer of the New Brunswick Electric Power Commission. Before joining the Commission in 1922, Mr. Vandervoort was with the Hydro-Electric Power Commission of Ontario. He succeeds **Mr. S. R. Weston,** who recently resigned to take up another position.

Mr. W. H. Liggins, A.M.I.E.E., who has just retired from the position of deputy electrical engineer to the Hove Corporation, has been presented with a gold wristlet watch on behalf of the staff of the Electricity Department and colleagues in other departments of the Corporation who have also presented to Mrs. Liggins a necklace of pearls. The presentation was made recently by Mr. F. Swarbrick, A.M.I.E.E., the engineer and manager of the electricity undertaking.



Mr. W. H. Liggins

Mr. Liggins commenced his career with the Kensington & Knightsbridge Electricity Supply Co., which he joined in 1890. Three years later he went to the Hove Electricity Co., but in 1900 he returned to the Kensington & Knightsbridge Co., and the Charing Cross Electricity Supply Co. In 1903, however, he rejoined Hove, where he has been ever since.

We regret to learn that **Dr. T. H. Hogg,** chairman and chief engineer of the Hydro-Electric Power Commission of Ontario, was recently injured in a motor accident. The latest report we have, however, states that his condition has greatly improved.

Obituary

Mr. R. D. Given.—We regret to announce the death, on February 28th, of Mr. Ralph David Given, head of the Industrial Engineering Department of the British Thomson-Houston Co., Ltd., Rugby. Mr. Given, who was born in Musselburgh in 1882, was educated at Daniel Stewart's College, the Heriot Watt Technical College, and Edinburgh University, graduating in April 1907, gaining a Whitworth Exhibition, and winning the Watt Club silver medal for engineering subjects. Before commencing his university training he served a six years' apprenticeship in mechanical engineering at the works of James Bertram & Son, Ltd., Leith, where he obtained his early experience of paper making and similar machinery.

After his university training Mr. Given spent two years with W. H. Allen, Sons & Co., Ltd., Bedford, on the design of high-speed engines, electric lighting plant, and pumping plant, and in 1909 he went to South Africa to join the staff of the General Mining & Investment Corporation, Ltd., Johannesburg, with whom he became chief draughtsman. On returning to England in June, 1913, he joined the staff of the B.T.H. Company, in what was then known as the Power & Mining Department at Rugby. This department developed into the Industrial Engineering Department, and Mr. Given, as chief of this Department, used his wide experience in solving many problems relating to electric driving in industries such as mining, rolling mills, paper making, etc. Mr. Given was a past president and an active member of the Rugby Engineering Society.

The late Mr. R. D. Given

Mr. J. D. Knight.—We regret to report the death, on March 5th, of Mr. J. Douglas Knight, former borough electrical engineer of Ealing. He retired in 1934 after holding the appointment for thirty-eight years. In 1936 Mr. Knight was elected to the Ealing Borough Council and was vice-chairman of the Electricity Supply Committee. During the last three years of his professional life he was a member of the Council of the I.M.E.A. The interment took place at Charlton on Tuesday last after a service at St. Mary's Church, Ealing.

Mr. L. Mackinnon.—The death occurred on March 2nd, of Mr. Lachlan Mackinnon, jun., who was assistant district engineer for the Glasgow and South Scotland area of the Central Electricity Board. Mr. Mackinnon was a son of Mr. Lachlan Mackinnon, former general manager of Glasgow Corporation Transport Department. He began his carrer with the Clyde Valley Electricity Supply Co., and joined the staff of the Central Electricity Board some years ago, working first in Perthshire during the building of a power station there and later he was transferred to the head office at Jordanhill, Glasgow, where he was appointed assistant district engineer. Mr. Mackinnon was thirty-eight years of age.

Will.—Mr. D. D. L. Cooper, a director of the Clyde Valley Electrical Power Co., and other Scottish electricity supply companies, left personal estate in Great Britain of £37,006.

Consumers' Records

Suggested Simplification

By H. Hobbins
A.M.I.E.E.

GREAT progress has been made in the production and distribution of electricity during the last decade, but the same cannot always be said of the methods used in supply undertakings' offices. Sometimes "experts" have introduced complicated sytems, and in other cases antiquated methods have survived the days of carbon lamps and Manchester dynamos. In either case prompt attention to consumers' needs is often impeded because of a "high resistance" in office routine due to the unsuitable methods employed in keeping consumers' records.

The suggestions put forward in this article are simple expedients based upon common sense and experience, the keynotes being simplicity and the avoidance of costly equipment. It is, in fact, a study of ways and means of reducing office expenditure and improving the usefulness of office records which no business concern can afford to ignore, especially in wartime. A surprising amount of capital is tied up in expensive cabinets, and special books and forms much of which could be eliminated with advantage.

The first and most obvious simplification, as a few undertakings have realised, is the use of cards instead of foolscap sheets for application forms, hiring agreements and other similar documents. It is admitted that some concession must be made to the formalities of legal procedure, although even this is mostly an unnecessary evil; even so there is no reason why cards should not take the place of the unwieldy sheets generally used, except perhaps in the case of bulk power consumers. The matter is of special significance in these days of paper and metal shortage. The saving of floor space and the much reduced cost of filing cabinets are also very important considerations.

It is contended that too much paper and time are wasted in the offices of electricity supply undertakings and that far simpler methods can be just as effective

The standard 8 in. by 5 in. card is a useful size and is large enough for the majority of agreements or records prepared by supply authorites. Where possible cards should be used vertically as, generally speaking, the most effective use of the space available is thereby obtained, and they are more convenient to refer to when filed.

The second important consideration is the layout and the wording of forms. An economy of words and space means a saving in printing and paper costs. If the cumbersome legal prose is really necessary it can at least be reduced to a minimum, and there is no reason whatever why the most essential information, the consumer's address and name, should not appear at the top of the form and not half way down. Anyone who has had to "thumb" through files will know how exasperating it is to locate a particular document when the key information is not in an easily readable position. Yet there are many forms in use which have the address to which the forms relate buried below inches of headings, telephone numbers, office addresses, etc., and sometimes below some previous address or other secondary information.

Addresses Most Important

The key to a consumer's records is the address, the name is secondary because this may change, so provision should be made to accommodate several changes on record cards because previous history is often necessary and useful. The address, therefore, as already mentioned, should appear right at the top of any document or record and filed in address (alphabetical) order. The use of numbers is a very overrated practice and, except for statistical purposes or mechanised accountancy, is worse than useless because the address must always be quoted and any system of numbering is only an encumbrance, adding unnecessary labour to every communication, record, or instruction. It is advisable, however, to allocate numbers in addition to names of houses in roads where the practice of using names is persisted in.

The tendency to have too many headings printed on internal orders, reports, records and other documents intended for use inside the organisation is frequently overlooked. Such obvious headings as "consumer's record card" "consumer's name" "consumer's address" and so on are superfluous and a waste of space and print. Consideration of this aspect of records introduces two other important factors, that of suitability and flexibility. It is almost impossible to find a form or record sheet that has its spaces so correctly formed that the wording which has to be "filled in" fits properly. Always there is a large space for a small item and a small space into which long numbers or several words have to be squeezed. This difficulty partly involves the consideration of flexibility, because no matter how carefully a form is planned, after it has been printed in thousands some small alteration in the undertaking's affairs is almost certain to crop up and cause the layout of the documents to become unsuitable, and so invariably rather than scrap them, unsuitable wording or awkward spacing is endured.

Mr. Hobbins is a consumers' engineer with many years' experience of records

There is undoubtedly a definite mania for printed forms, duplicate books and the like. Every office has its mortuary of obsolete forms and books, some of them produced at considerable cost and the total wastage of paper and printers' ink throughout the country must be considerable. The cure for the complaint is a simple yet effective one. It is to avoid printed forms like the plague and use where and whenever possible blank (ruled feint) cards, papers or carbon copy books. Exception must, of course, be made in the case of documents that are sent outside the undertaking.

Where the information to be recorded must be entered in a certain order all that need be done is to issue to the staff concerned "key sheets" showing the items required for the particular purpose of the record and the manner in which they should be entered. These "key sheets"—one for each class of record or works instruction—may be kept before the persons concerned or, in the case of carbon manifold books, on the inside of the cover. Thus, ruled blank sheets, cards or books need be the only stationery for all office records, inter-departmental instructions, periodic reports and the like. The staff would soon become familiar with each "key" and would require to refer to them only when alterations were made.

This scheme provides the fullest flexibility and suitability possible, which is an important consideration for offices of any growing concern. That there may be an additional amount of writing or typing involved if printed forms are not used is a doubtful criticism. Frequently, as already mentioned, the printed words are unnecessary. In any case the "key" would provide all the headings so there would be no point in writing them out each time.

The value of coloured and specially headed memo papers for inter-office correspondence is doubtful. References and the name of the department or person concerned are generally typed on in any case, so why should printed headings and fancy colours be required? They only mean an increase of idle stock because a reserve of each pattern must be held.

Simplified Routine

The final and perhaps the most important aspect of this subject of office records is the labour involved in copying the same information from one document to another when a little forethought would enable one document to do the work of two or more. For example let us examine, very briefly, a typical routine and see how it could be simplified.

An undertaking receives a request for a supply of electricity to domestic premises. The applicant is presented with a document which is not too easy to fill in correctly. He will grumble, but if he is in the showroom he will receive the patient guidance of a member of the staff and eventually he will complete the document which will be passed to the consumers' clerk. The clerk transfers the information on to another form—the "first copy." Certain

tems are accentuated by means of that office plague, the rubber stamp, which is invariably stamped askew or upside down and blots out much useful space. An entry is also made in a kind of day book in order that the clerk may keep in touch with the job in hand, and so there is a " second copy." Sometimes a further small entry is necessary in an index book to facilitate reference when answering telephone queries concerning work in hand.

The newly filled form is passed to the mains office and if the service is in order they state so on the form and pass it on to the meter department, who immediately copy out the information supplied by the clerk on to another form in a multi-copy carbon book, which forms a third copy. The meter fixer and inspector take their respective copies from the carbon book. Being flimsy paper sheets they are not easy to enter meter numbers, etc., upon, especially on the job.

Eventually all these sheets are returned to the office and copied out again, a fourth time, on to the consumer's record card and, of course, a meter card. This routine omits many important details and may vary in different undertakings, but it serves to illustrate the point.

Now consider a simplified routine. The agreement for supply printed with a straightforward layout on a card is duly completed and passed to the clerk. The clerk enters upon a plain ruled card, in a fashion indicated by his " key " card, details and instructions to works. This is " Copy No. 1." This card is passed to the mains office and thence to the meter department. The meter fixer clips his card with other similar cards in a folder with a rigid cover which forms a robust container for his day's instructions and something upon which he can write up the meter particulars with a good chance of his writing being legible. The inspector, in his turn, takes the same card and records his report on the back and when the work is complete the card is returned to the consumers' clerk.

The clerk in the meantime has retained the original card which the consumer signed in a card file box on his desk, after making a date entry in one corner to indicate that the work is in hand. This file forms a handy reference and eliminates the day book and index. Upon receiving the returned instruction card he clears the original document and sends both cards into file. The instruction card then becomes a record card and a very complete record, too, all for only one copy.

The criticism that a card passing through so many hands may get lost or soiled cannot be accepted. Meter reading cards survive much handling, are rarely lost and the information on them is still legible even after several years' use. There is not the slightest doubt that those hidebound traditions of bureaucracy, the printed form and the rubber stamp, as well as the interminable copying out of the same words and figures are responsible for considerable waste. One cannot deny their usefulness within proper limits, but they are invariably carried to excess in most offices.

I would like to make, in conclusion, an appeal for standard sizes and shapes for catalogues, price lists, invoices, advice notes and order forms. These items are important business accessories which are passed from one concern to another, yet their varied designs, shapes and sizes make it impossible to file them in a manner which makes constant reference as easy as it should be. Fewer sizes would effect economies in folders, cabinets, envelopes and other office accessories, but, like that other ideal—standard tariffs—this is, perhaps, too much to expect.

Bulk Supply and Rate Charges

Costs Based on Hypothetical Extensions

THE position with regard to rate charges of undertakings who are receiving a supply from the Central Electricity Board forms the subject of an interesting letter from Mr. W. Allison Davies, borough treasurer of Preston, in the March issue of *Local Government Finance*, the official journal of the Institute of Municipal Treasurers and Accountants. Mr. Davies points out that the cost of the bulk supply is supposed to be equal to that at which the undertaking could generate its own energy and one of the factors entering into the computation of the price is the amount which would have been payable in respect of rates had the station been actually extended. The Central Board, in turn, is called upon to meet charges for rates on the grid system and it is only fair that some contribution should be made to the Board's funds under this heading.

Undertakers should see, however, that they are not placed in the position of having to face a larger burden (because of an excessive allowance in respect of the assumed rate charge) than if they had been working independently of the Board, when their rate liability would have been limited by the valuation in cumulo of their undertaking.

In the generality of cases the effect in the early years of the introduction of new plant, with the consequential increase in the statutory deductions, would be to depress the cumulo value unless there were an abnormal growth in the receipts. There is, however, another feature to which attention should be directed.

Effect of 1926 Act

The alteration in the accounting arrangements brought about by the operation of the Electricity (Supply) Act, 1926 (which requires the whole output of the generating station to be sold to the Board and the quantity required by the undertakers to be purchased from the Board) tends to diminish the cumulo value for the following reason. The amount paid to the Board is the price of the energy bought ; as such it is indivisible and is therefore allowable in the valuation as a working expense. The price—that is, the cost of independent operation—includes the interest and sinking fund charges on both the actual capital expenditure and the notional outlay on the extended station. The inclusion of the actual charges does not affect the cumulo value, inasmuch as the sums repaid to the undertaking under Section 7 of the Act (whether they be brought into the valuation as a receipt or deducted from the working expenses) entirely offset the corresponding amounts included in the independent operation costs. Neither does the inclusion of the amount regarding sinking fund contributions, or loan repayments related to the notional capital make any material difference, as allowances approximating thereto would normally be admissible in respect of replacements or renewals.

There remains the amount included in the payment to the Board as being equivalent to the interest which would have accrued on loans assumed to have been raised to meet the cost of the hypothetical extension. As this is not counterbalanced in any way, it follows that what would not have been allowed under this heading, had the station been in fact extended, becomes an admissible deduction, and the cumulo is accordingly diminished by an amount approximating to the interest on the notional capital outlay on the hypothetical extension.

Review of Assessments

In the light of the foregoing observations, it is suggested that, where hypothetical conditions prevail, electricity assessments should be reviewed, so that, if found to be excessive, proposals may be lodged before the close of the present rate year. It is desirable that in the apportionment of the cumulo a sum should be definitely allocated to the generating station, the charge on this assessment being the amount to be included in the cost of production as calculated in accordance with the provisions of Section 7.

To ascertain the rates appropriate to a Section 13 computation, it has been found convenient for a *pro forma* cumulo valuation to be prepared on the assumption that the generating station had actually been extended, in which circumstances all transactions with the Central Electricity Board would be limited, *i.e.*, the payments to the Board would not form part of the expenses nor would the payments made by the Board be included in the receipts. Adjustments must, however, be made in the items comprising the working expenses, having regard to the additional cost of coal, other stores, wages and management, consequent upon the introduction of the notional plant. Repairs and maintenance and insurance charges will also be increased. In such a valuation the allowance for replacements will have regard to the notional assets as well as to those actually in existence, but, in accordance with established practice, no deduction will be made on account of the notional interest liabilities. The apportionment of this hypothetical valuation as between the generating station and the rest of the undertaking should be made on a basis similar to that adopted in the case of the actual valuation.

Concentration of Production

Statement by the President of the Board of Trade

We refer in our leading article to the statement made in the House of Commons last week by Mr. O. Lyttelton, President of the Board of Trade. The main points of this are set out herewith

THE aim of the Government's economic policy in war-time is to facilitate the fullest possible transfer of resources to war production. This policy demands the severe cutting down of civil consumption and the release of labour, materials and factory space for more essential purposes. Substantial cuts have already been made and these may well have to be extended. In particular the Government is concerned with the group of industries manufacturing consumer goods affected by the Limitation of Supplies Order or by the rationing of raw materials —hosiery, pottery, the major textile industries, boots and shoes and some others. These industries provide the main sources of factory-trained labour for munitions, and their consumption of imported materials must be kept down to the minimum.

If they consulted only their own interests these industries might wish that all their component firms should carry on with their remaining share of the trade in the hope that conditions might improve. From the point of view of the national interest, however, it is most undesirable that cuts in civil consumption should be met by large-scale part-time working. A spread-over of this kind results in an uneconomical use of certain types of labour. It does not free the factory and storage space which will, in many cases, be needed for Government use. The effect of a diminished turnover on costs may, in some instances, have serious repercussions on prices which the Government cannot ignore. Finally it would be worse than useless for firms to allow their working capital to be eaten up in the vain hope that the position might become easier.

Full-time Working

The policy of the Government must, therefore, be to concentrate production in a reduced number of factories working full time. These factories should be able to produce the output required for Government orders, the greatest practicable export trade and the minimum needs of our population, while at the same time preserving the goodwill of the factories closed down. The closed factories should be kept ready to start up again as soon as possible after the war. The Departments concerned will then take all measures open to them to assist their speedy re-opening; meanwhile records will be kept of factories closed down and transferred workers so that they may be able to resume their activities after the war.

The Government will facilitate this concentration by granting to groups of undertakings which fulfil the necessary conditions special help to safeguard their requirements of labour and of raw materials. Losses due to the war assume various forms and the Government regrets that it cannot contemplate the use of public funds to relieve the position and provide compensation. Where, however, business losses are due to a process of industrial consolidation, under which certain firms by closing down permit more work to be undertaken by others, there is a clear duty on the latter to provide a measure of compensation for the former. The Government feels confident that those concerned will carry through these group arrangements in a manner that will mitigate hardship.

In pursuance of this policy, the Board of Trade, in association with the Ministry of Labour, will open discussions as soon as possible with representatives of employers and workers in the industries concerned as to the degree of concentration which they should achieve, and the other matters arising; for example, the factories to be left in production should not be in districts where the demand for labour for munitions is relatively heavy.

Export Council's Scope Expanded

In order to help the Board of Trade in carrying out this task, the scope of the Export Council is being expanded, and it will be re-named the Industrial and Export Council. A Committee of the Council will be formed, which will include the Parliamentary Secretary for Raw Materials of the Ministry of Supply and a representative of the Ministry of Labour. The number of business members of the Council is also being increased, so that men themselves experienced in business may advise and guide the industries concerned in carrying through this difficult work of reorganisation.

The Government is looking to the industries themselves to co-operate by formulating proposals for effecting the necessary measure of concentration, in consultation with the Government Departments concerned. The firms themselves should be in the best position to frame plans in the light of their knowledge of their own capacity and circumstances. At the same time, the Government accepts ultimate responsibility for seeing that the necessary measure of concentration is achieved, and, where firms are either unwilling or unable to meet the situation by their own efforts, the Government will be prepared in the last resort to impose the re-organisation which circumstances require.

The Board of Trade is being entrusted with the task of co-ordinating the requirements of all Government Departments for factory and storage accommodation; an executive organisation is being established under a Controller-General of Factory and Warehouse Accommodation. It will be the Board's purpose to meet the requirements of the various Departments as far as possible without interference with the factories in which work is being concentrated under the arrangements which are described above.

Members' Questions

Mr. Shinwell asked if the President of the Board of Trade would consider, in lieu of Government financial assistance—though on that point the matter might be reconsidered—the creation of holding companies in which redundant and closed firms would have a share in the financial stake; and whether he had taken into consideration the importance of speedy absorption of the labour which was dispossessed.

Mr. Lyttelton replied that the nature of the scheme was that redundant firms or members of redundant firms should be compensated by those who were going to be able to work at full capacity. The appropriate machinery for securing that profits were distributed in an equitable way would vary in each industry, and nothing would necessarily preclude the distribution of profits by a holding company, but there might be even better methods. The second question was really a matter for the Minister of Labour. No legislation was required, because the supply of raw material and of labour and plant was already under Government control.

Mr. Higgs asked if it was still the Government's intention to encourage export trade, and Mr. Lees-Smith asked the Lord Privy Seal whether, if there was a desire, he would arrange for a debate on the subject.

Mr. Attlee said that he would, but regard had to be paid to the pressure of business. Perhaps Mr. Lees-Smith would discuss the matter at the appropriate time, but there was a good deal of financial business before Easter.

In reply to further questions, Mr. Attlee said it was obvious that in a matter like this action must be taken at once. Members might be agreed on the need for concentration, but the question of how it was done might well be debated.

Powdered Anthracite Plant

EXTENSIONS at the Hauto "mine-mouth" station of the Pennsylvania Power & Light Co. include two boilers rated at 350,000 lb. per hour, with steam conditions of 1,325 lb. per sq. in. and 930 deg. F. They will be fired with powdered anthracite and, the *Electrical World* states, more than 500,000 tons will be burned per annum. The total consumption of anthracite by the company, which claims to be the largest user of this class of coal in the world, is given as 1,500,000 tons. A 35,000-kW topping turbine is also to be installed, which will bring the capacity of the station to 110,000 kW at the end of next year. The cost of the extensions is estimated at five million dollars.

Electrical Contacts

Comparative Advantages of Copper and Silver

By "Delta"

COPPER is generally adopted for the current carrying parts of switchgear because of its high conductivity, good mechanical strength and high salvage value.

For a given resistance, the temperature rise is dependent upon the radiation and conduction of heat from the joint. The greater the joint mass and exposed surface, the lower will be the joint temperature. At moderately elevated temperatures, copper oxidises rapidly both in air and under oil. Copper oxide has a high resistance, and a comparatively small amount on a contact surface is sufficient to initiate local heating which, once started, accelerates rapidly. This characteristic governs design features of electrical control gear and prevents the safe reduction in size and weight of both stationary and moving contacts.

The formation of oxide films can be reduced by using filed and polished surfaces, which restricts the entry of air and also gives a large number of contact points. Thus, a knife switch with a sliding action between the surfaces at each operation allows a large number of points of contact to be cleaned of oxide.

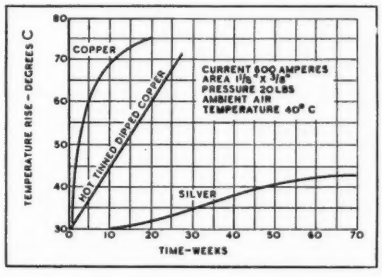


Fig. 1—Comparative time-temperature curves for three types of contact

One remedy for corrosion is to seal the joint after assembly by coating the prepared surfaces with vaseline or boiled linseed oil and allowing the surplus to remain on after clamping or bolting. Switches have often to carry high currents for long periods without opening and closing, and the increased heating may be dangerous. The effectiveness of silver is due to its high conductivity and its mechanically unstable oxide which does not accumulate readily in sufficient quantities to cause any great increase in contact resistance with consequent heating.

The tests forming the basis of the curves in fig. 1 were made on an oil circuit-breaker equipped with contacts of different kinds for prolonged heat runs. The sample contacts were 1⅛ in. by ¾ in. rectangular surfaces held together at a pressure of 20 lb.* A current of approximately 600 A was passed through the contacts, as this value gave a 30 deg. C. rise above an ambient air temperature of 40 deg. C., while the contacts were opened and closed once a day on no load. Copper contacts reached a high temperature after a few weeks, whereas silver contacts showed only a moderate increase in temperature at the beginning and then became constant.

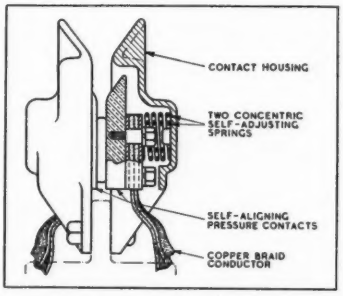


Fig. 2—Typical outdoor switch contact of the full-floating, spring-pressure, line-contact type provided with silver surfaces

Silvered contacts have been employed on indoor isolating switches. In one design the hard-drawn-copper tongue, blade contacts and hinge tongue are provided with raised silver surfaces. Such contacts are claimed to prolong the life of the switches, retard the increase of contact resistance with age, ensure low maintenance costs and give low contact losses. The application of silver plating to current carrying contacts permits a reduction in the size of the contacts compared with those of plain copper, as in oil circuit-breaker disconnecting devices on metalclad switchgear, plug contacts on truck cubicles, special busbar joints and contactor gear. The typical arrangement of a contact jaw for an outdoor airbreak switch, illustrated in fig. 2, consists of a line contact of the full-floating spring-pressure type with two large semi-cylindrical silver-surfaced copper-drop forgings. These are enclosed in a housing which contains double helical springs fitted into a recess. The housings have flared ends which form a guide for the blade. The contacts are pressed towards each other by the spring pressure, while flexible copper braids provide the current paths between the contacts and the switch terminals. The blade makes line contact, the pressure on the blade increasing as it spreads the contacts. In order to minimise the accumulation of ice on the contacts, sleet hoods are generally provided.

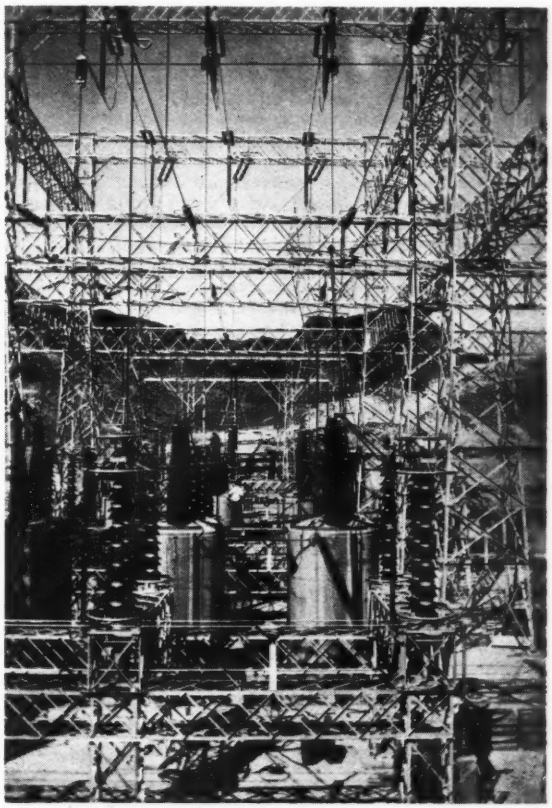


Fig. 3—The 287-kV Boulder Dam switching station in which silver contacts are very largely employed

The 287-kV outdoor vertical-break isolating switches installed at the Boulder Dam switching station in the United States (see fig. 3) have a large area of silver contact in order to eliminate the mechanical and electrical difficulties that occur with point contacts of small area.

The contacts of this equipment are engaged under only a light and adjustable pressure, but after they have come into full engagement and relative motion has finished, a pressure of about 500 lb. is applied, clamping them rigidly into position. In opening the switch, the high pressure is relieved entirely before the contacts start to move.

* "G. E. Review," Vol. 36, No. 12.

Combustion in Wartime

Making the Most of Low-grade Fuels

By A. C. Dunningham, D.Sc., A.I.C., F.Inst.F.

Power station engineers have to pay dearly for their coal nowadays. If, however, they will take the necessary steps to ensure proper combustion they may use lower-grade fuels, with a saving to themselves and with advantage to the nation

IN wartime industrial fuels tend to show greater variations in quality than under normal conditions. Sometimes the usual supplies can no longer be obtained owing to the demands of new war industries, and as a result it becomes necessary to take entirely new fuels. These are sometimes from quite different fields and of varying quality and they behave quite differently during combustion. Such changes in supplies will be particularly disturbing in plants where a limited number of carefully specified fuels is burned and where, therefore, adjustments in combustion conditions are rarely found to be necessary.

There is a tendency to-day to avoid difficulties by specifying washed fuels graded within narrow limits, thus creating an artificial shortage in these fuels whilst ample supplies of less uniform and cheaper fuels may be available. Modern developments in the technique of industrial combustion have enabled many low-grade fuels to be used with advantage, and those who have adopted them are in a position to-day to utilise to the best advantage whatever fuels may be available.

The composition and properties of a coal can be determined by careful analysis, and its behaviour on a grate predicted with considerable accuracy. A practical burning trial, however, is essential in order to check up the conclusions reached from a consideration of the analysis, and in making this trial certain fundamentals of combustion must be kept in mind.

Good combustion consists in burning the carbon in the fuel completely to carbon dioxide without unnecessary excess of air so that, on the one hand, no heat is lost in unburned combustible or, on the other, wasted in heating excess air. This necessitates good contact between air and fuel which is relatively easy to attain when the latter is in gaseous form and only slightly more difficult when it consists of pulverised solid fuel. It is much more difficult in the case of solid coal burned on a travelling grate because of lack of uniformity in the fuel bed and the practical difficulties of performing this apparently simple operation of combustion are indicated by the fact that it is considered good practice if 30 to 50 per cent. of excess air is used to burn bituminous coal on a travelling grate with a corresponding carbon-dioxide percentage of 14 to 12 per cent. in the flue gas instead of the theoretical figure of 18 per cent.

TABLE I.—SEGREGATION OF COAL IN BUNKER

PERCENTAGE THROUGH ⅛ in.	1	2	3	4	5	6	7
	2.30 p.m.	6.30 p.m.	10.30 p.m.	2.30 a.m.	6.30 a.m.	10.30 a.m.	1.30 p.m.
Average sample	26	33	34	34	28	31	21
Left side of grate ..	28	35	31	28	27	28	25
Centre of grate	33	41	44	45	40	44	30
Right of grate	14	25	26	28	18	20	8

TABLE II.—RESISTANCE OF FUEL BED WITH VARYING PROPORTIONS OF FINES

Per cent. through ⅛ in.	Resistance (mm. water)
10	8
20	14
30	25
40	48
50	72
60	80
70 ..	Bed broken down and channelled.

Uniformity in the bed is most nearly obtained with a closely graded fuel. With slack covering a reasonably wide range in size, segregation almost invariably occurs at certain stages of the handling because, whenever it falls freely on to a pile the larger pieces run to the outside, leaving finer fuel in the middle. I have known a case in which slack was elevated mechanically and discharged to an overhead bunker down a vertical chute placed, not centrally, but toward the left of the bunker, facing the grate. Coarse coal concentrated at the ends of the bunker, the larger being at the right, whilst finer coal was left in the centre. Two Taylor chutes conveyed the coal to the hopper above a 14-ft. chain grate on which the coal was found to be finer at the centre and coarser at the sides as shown by the figures in Table I taken at four-hourly intervals over a twenty-four hour period.

These figures show that not only is there a consistent difference in grading across the width of the grate, but there is also a variation with time in the average grading of the fuel fed to the grate as a whole. Such variations across the grate can be avoided by the use of either a single Taylor chute or a pendulum chute, whilst variations with time can be largely overcome by feeding the storage bunker from a number of points instead of from one. Peacock* has shown that segregation in a bunker may be prevented by the use of baffles or partitions dividing the bunker into a number of vertical compartments, the upper ends of these having a contour which follows closely the angle of repose of the fuel. The chute feeding the bunker is situated over the centre compartment.

TABLE III.—EFFECT ON RESISTANCE OF ADDED WATER

Per cent. through ⅛ in.	Minimum resistance mm. of water	Per cent. addition of free water necessary
79	17	15
70	18	12.5
43	17.5	10
34	15	10
30	15	7.5
28	16	7.5
16	12	5
7	10	5

The question of segregation has been dealt with at some length because the resistance of a fuel bed varies very considerably with the percentage of fines under ⅛ in., as shown by Table II determined by passing air at the rate of 190 lb. per sq. ft. per hr. through a 6-in. bed of fuel to which 5 per cent. of free water had been added.

TABLE IV.—EFFECT OF SIZE ON FUEL-BED THICKNESS

Fuel	THICKNESS OF BED AT END OF IGNITION PERIOD (inches)					
	1½–1	1–¾	¾–½	½–¼	¼–⅛	⅛–3/16
High hazel .. 3 to 4 per cent. ash	–	6	6½	8	10½	11¼
Mixed seams .. 3 per cent. ash	6½	7*	—	9½	11	12 *1–½in. size
Parkgate .. 3 per cent. ash	—	—	9	11½	13½	14¼
Per cent. free water added	—	—	—	—	2½	5

The resistance of the beds containing the higher percentage of fines can, however, be reduced very considerably by the addition of further water, the amount required to reduce the resistance

* *Journal*, Institute of Fuel: XI, 57, February, 1938, pp. 230, *et. seq.*

to a minimum depending on the proportion of fines present, as Table III. Thus, by the addition of free water, the differences in resistance of beds with wide variations in the percentage under ¼ in., can be made relatively small.

For an ordinary 1-in. slack, water of the order of 7½ per cent. is necessary for the best results, whilst a ¼-in. fuel would require up to 15 per cent. The importance of uniform wetting cannot be over emphasised. A uniform burning rate over the grate can only be ensured by a uniform fuel-bed resistance and this cannot be obtained if the moisture content of the fuel is variable. Irregular combustion then takes place and the grate may become bare in some places before the fuel is burned off in others. The old practice of wetting slack before firing is thus fully justified because of its effect on the resistance of the fuel bed. It has sometimes been claimed that better results are obtained when the wetted fuel is allowed to stand for a period before use. If this be so it can only be explained on the supposition that the water becomes more uniformly distributed through the mass of coal during the standing period.

Uniform grading and wetting of a slack fed to a chain grate will as nearly as possible ensure a fuel bed with uniform resistance. When, however, the fuel becomes ignited, changes in the physical condition of the fuel bed may occur, particularly in the case of coking coals. These changes occur mainly during the ignition period, that is, while the ignition plane is passing downward through the fuel bed to the grate. In the case of a free-burning fuel, the individual particles do not swell or cohere to one another so that a compact bed is maintained with good contact between air and fuel. Since such coals are also reactive, a high proportion of carbon monoxide is present in the gases leaving the bed, the combustion of which must subsequently be completed by the addition of secondary air, either purposefully or through the back of the grate. With such fuels it is easy to maintain a compact bed up to the back of the grate where a well-burned clinker is formed with a minimum of free air passing through the bed.

TABLE V.—RELATION OF FUEL-BED THICKNESS TO ASH CONTENT AND BURNING RATE

Fuel	Dry Ash	Burning Rates (16 per sq. ft. per hr.) Air : 110 / Fuel : 15	190 / 25	290 / 37	355 / 49
		Fuel-bed Thickness at end of Ignition Period (inches)			
High hazel slack (free-burning)	3	8.8	6.6	4.0	3.0
	6	8.2	6.2	3.5	2.6
	9	7.8	5.8	3.2	2.3
	12	7.5	5.6	2.9	2.0
Parkgate slack (coking)	3	11.0	12.0	11.3	10.5
	6	10.6	11.4	8.7	6.5
	9	10.4	10.9	8.2	6.0
	12	10.2	10.4	8.1	6.0
Silkstone slack (coking)	3	11.9	12.4	12.9	11.5
	6	11.2	12.0	11.9	9.4
	9	10.6	11.7	11.1	8.2
	12	10.1	11.5	10.5	7.1

Formation of Coke

In the case of a coking coal, the particles swell and fuse together during the ignition period so that large masses of coke are formed. The air passes through the fissures between these and makes much less efficient contact with the coal than in the case of a free-burning fuel. The result is a lower percentage of carbon monoxide in the gases leaving the bed although this tendency is partly offset by the thicker fuel bed caused by swelling of the coal. Toward the back of the grate it is more difficult to burn out all the carbon from the ashes, and more free air passes through the grate in doing so. It is thus more difficult to secure a high carbon-dioxide percentage in the flue gases.

The degree of swelling of the bed and the size of the resulting masses of coke depend primarily upon the rank of the coal but they are also affected very considerably by size. The figures in Table IV, determined on a 6-in. bed with a primary air rate of 190 lb. per sq. ft. per hr. show that, generally the smaller the coal, the greater the swelling and fissuring.

The swelling properties can also be modified by an increase in either the ash content or the burning rate, although these factors are to some extent inter-related, as will be seen from Table V which again refers to a 6-in. fuel bed.

It will be seen that the swelling of Parkgate slack is not materially affected when the ash content is only 3 per cent. although at 6 per cent. and over, an increase of the air rate above 190 lb. per sq. ft. per hr. lessens the swelling. Similarly, an increase of ash does not reduce the swelling appreciably until the air rate exceeds 190 lb. per sq. ft. per hr. With the more coking Silkstone coal, the limiting air rate is still higher.

In practice, the swelling and apparent coking properties of a normal industrial coking slack can be materially reduced by using a high burning rate, and this is really the secret of burning strongly coking coal successfully. The degree of swelling is actually determined during the ignition period so that it is particularly necessary to maintain a high primary air rate over the front of the grate once initial ignition of the fuel has taken place. This can be ensured on a forced-draught stoker—which is almost essential for burning strongly coking coals—by opening the air supply fully on the compartments immediately behind the initial ignition zone. The air supply at the back of the grate will be cut down in order to burn off the carbon in ashes, which is much more difficult than in the case of a free-burning fuel.

I noted a striking illustration of the above principles recently when a strongly coking Durham 1½-in. dry-cleaned slack was burned on a 14 ft. chain-grate stoker at an average rate of approximately 28 lb. per sq. ft. per hr.—equivalent perhaps to 50 lb. in the actual burning area. The segregation effects already noted were apparent on this grate, the fuel at the centre having 48 per cent. through ⅛ in. as compared with 32 per cent. on the left and 21 per cent. on the right side. Moreover, although the fuel had been wetted, sufficient moisture had not been added to reduce the resistance of the fine fuel to a minimum. Consequently the resistance in the middle of the grate was considerably higher than that at the sides, and the air rate at the centre was correspondingly reduced.

The observed effect was striking. At both sides the fuel burned off regularly and completely, but in the middle, a mass of fuel consisting of large pieces of coke extended to the back of the grate. This irregularity of the fuel bed could have been largely avoided if the fuel bed had been uniform so that the effective coking properties, as determined by air rate, had been the same across the width of the grate. This is perhaps an extreme instance of the adverse effects of an irregular fuel bed. They are less marked with free-burning and semi-coking coals.

Factors in Ignition

The ignition of the surface of a bed of coal is the result of two opposing factors—the heating effect caused by radiation from the combustion chamber and the cooling effect of air passing up through the fuel bed. In order to raise the fuel to its ignition temperature, air should be cut down to a minimum at the front of the grate by means of a dead plate, or other arrangement, but as soon as ignition is established, air necessary for combustion should be increased as rapidly as possible, particularly with coking coals. The ignition temperature of coal rises with rank so that low-rank, free-burning coals ignite most readily, the difficulty increasing as the coal becomes more coking; high-rank steam coals and anthracite are the most difficult.

These difficulties are not, in the case of bituminous coals, of great importance because normally the combustion chamber is sufficiently hot to raise the coal well above the minimum ignition temperature, although in modern boilers with archless settings it is sometimes difficult to ignite nuts much over 2 in. in size. Difficulties in ignition may often be traced to poor combustion leading to reduction in the furnace temperature. As an instance, considerable difficulty was encountered when burning a fine low-grade South Midland fuel owing to retarded ignition. This fuel, because of the practical difficulties involved, had been imperfectly wetted so that an irregular fire resulted, with reduced efficiency and lower furnace temperature. The difficulty was finally overcome when arrangements were made to wet the fuel more uniformly and thoroughly. This gave a low and uniform fuel-bed resistance, regular and efficient combustion, an increased furnace temperature and easy ignition.

In conclusion it may be admitted that the use of a wide variety of fuels involves more intelligent and perhaps more troublesome control and adjustment of boiler conditions, but its general adoption would mean the better and more efficient utilisation of our fuel resources as a whole and a greater independence on the part of users of market conditions outside their control.

COMMERCIAL and INDUSTRIAL

Maintaining Export Contacts. Employment Control Order

The Importance of Exports

IN a speech at the Aldwych Club last week, Sir Cecil Weir, executive member of the Industrial & Export Council, stressed the need for the maintenance of export contacts. He outlined the present position with regard to raw materials and shipping and said that in spite of all that was being done in direct connection with the war very substantial quantities of raw materials were being allocated for export manufacture.

This was being done not merely because we required to sell British goods in order to pay for imported materials, but because we knew that the foundation of our economic prosperity lay in our overseas trade, and that sacrifices at home which did not imperil victory would be well worth while if they enabled us to maintain contacts and connections that would be of vital value when the war was over.

We would, however, have to be more selective and discriminating in the use of our resources than we had been hitherto. We would have to direct, guide and control our exports to serve a number of purposes, amongst which were the securing of necessary currency, the most convenient and economic use of shipping, the maintenance of valued connections, the reasonable satisfaction of our customers' needs and the accumulation of an adequate reserve of vital raw materials.

For manufacturers to lose their enthusiasm for export trade and become discouraged because of inevitable difficulties and disappointments would be to connive at the post-war industrial suicide of the nation and themselves. He hoped that the export-potential community would continue to concentrate attention on export problems, recognising that the long term reward was of itself an immense incentive, and that in wartime we should be resourceful and flexible in meeting the changing requirements of changing situations, while making the best of unavoidable impediments.

Exports to Iceland and the Faroes

Under a Board of Trade Order which came into force on March 6th, certain classes of goods, which require licences for export to certain specified destinations ("C" destinations in the Export Control List) will no longer require licences for export to Iceland and the Faroe Islands. Export licences will still be required for other goods in the Export Control List exported to these destinations. The Order (S. R. & O. 1941 No. 282) also makes certain minor relaxations in the list of goods requiring export licences.

Trade with Bulgaria

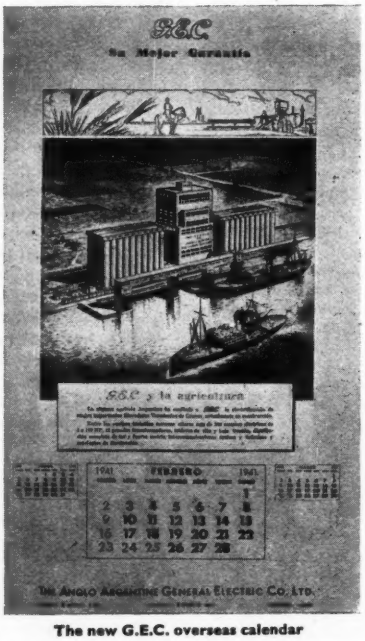
The Board of Trade announces that Bulgaria is enemy territory for the purposes of the Trading with the Enemy Act. It is accordingly a punishable offence to have commercial, financial or other intercourse or dealings with, or for the benefit of, any person in that territory. Inquiries should be addressed to the Trading with the Enemy Branch, 24, Kingsway, London, W.C. 2.

British Plant in Argentina

From a recent issue of the *Revista Electrotecnica*, the official organ of the Argentine Association of Electrical Engineers. we learn that the Compania de los Ferrocarriles del Oeste de Buenos Aires has commenced to replace the rotary convertors at four of its substations with mercury rectifiers. Orders were placed with the Hewittic Electric Co., Ltd., for three 1,800 kW and eight 1,200 kW, sets each rectifier to be provided with its own Hackbridge transformer. The equipment is designed to convert 20,000 V AC to DC at 800 V. Part of the plant has already been installed.

G.E.C. Overseas Calendar

The G.E.C. has prepared an overseas calendar as a practical expression of goodwill from the company to its friends overseas and as an indication of its firm determination to render maximum service under the present difficult conditions. In support of the country's export effort the



The new G.E.C. overseas calendar

company has amplified its overseas advertising and the calendar is complementary to the scheme. Measuring about 21 in. by 14 in., the calendar is being distributed to 7,000 business houses overseas, and in addition many more have been printed in Spanish for issue in Argentina. The calendar covers the period between March, 1941, and February, 1942, with the current, previous and succeeding months shown on each page.

Engineering Handbooks in Spanish

Sir Isaac Pitman and Sons, Ltd., announce that by an agreement with the International Engineering Publishing Co. they are to publish twenty-two engineering handbooks in Spanish in three series, covering civil electrical and mechanical engineering. The six volumes on electrical engineering deal respectively with electric circuits and measurements, generators and motors, transformers and convertors, transmission and distribution, applications of electricity, and electrical communications. The main object of these publications is to introduce British practice and British Standard Specifications to Latin-America and thus to further the interests of British industry.

Leaflets for War Workers

The Ministry of Labour and National Service has issued leaflets entitled "Going Away on War Work" (P.L.83), and "Engineering Training for Women" (P.L.84). The first contains a special foreword by the Minister of Labour and National Service, and provides answers to some of the questions likely to be asked by people who are leaving their homes to take up war work in other areas. Points covered in the leaflet include the journey and lodgings, and such questions as meals, recreation and medical facilities.

The second leaflet is devoted to women's training for wartime work in the engineering industry. It tells women how to apply for training, what types of courses are available and how long training takes. The leaflet also briefly describes what engineering work is like and deals with such questions as training allowances (including allowances for dependants) and training away from home.

Copies of the leaflets may be obtained from any Employment Exchange or direct from the Ministry of Labour and National Service (Public Relations Branch), Montagu House, Whitehall, S.W.1.

Control of Employment

Further measures of control of employment are contained in the Essential Work (General Provisions) Order, 1941, made by the Minister of Labour. This Order provides that firms which are certified as being engaged in "essential work," and their employees, shall be subject to a number of new rules. Scheduled firms must observe terms and conditions not less favourable than those laid down in the Conditions of Employment and National Arbitration Order, 1940, and must make suitable provisions for the welfare of their employees. Also, where the Minister considers it necessary, such firms must provide for the training of workers.

The right of the management of a scheduled firm to discharge its staff, and of the staff to leave, is in general subject to the permission of an official of the Ministry and measures to deal with "absenteeism" are provided. The employees of a scheduled undertaking will be guaranteed a minimum wage subject to certain conditions. Local appeal boards, comprising representatives of employers and workers, with an independent chairman, will hear objections against action taken by the national service officer, including any direction of persons to take up specified employment.

Utility Undertakings' Reports

The *Financial Times* states that the Commercial Gas Co. and the South Metropolitan Gas Co. have deferred the publication of their accounts for 1940 "in view of the fact that discussions are at present proceeding on the general question of the control of the publication of the reports and accounts of public utility undertakings" and at the request of the Ministry of Information.

Civilian Steel Helmets

Arrangements for the purchase of supplies of the new civilian type steel helmet by employers for the equipment of fire prevention personnel on business premises have been made by the Ministry of Home Security. Local authorities will act as agents for the Ministry, and sales will be made through distributing depots set up by these authorities in most of the large towns in Great Britain. Sales will be on the basis of sufficient helmets for one shift only, with additional helmets up to 50 per cent, so as to provide a range of sizes for exchange between persons. The price is 5s. 6d. each. Priority of supplies will be given to the areas to which the Fire

Prevention (Business Premises) Order has been applied by the Regional Commissioners.

Later, supplies will be available for fire prevention personnel in other areas, and the distribution scheme will be completed with the provision of steel helmets for all industrial and commercial workers.

Sulphuric Acid Control

The Treasury has issued the Sulphuric Acid (Charges) (No. 1) Order, 1941, which directs that a payment of 6s. 4d. per ton of sulphuric acid (70 per cent. basis) shall be made to the Minister of Supply (or as he may direct) in respect of all acid produced in the United Kingdom. The sum obtained will be used to meet increased cost of freights on imported raw materials, any abnormal costs of distribution of acid, and other contingencies. The Order, together with Direction No. 2 under the Control of Sulphuric Acid (No. 2) Order, 1940, came into effect on March 10th. Copies may be obtained from H.M. Stationery Office, York House, Kingsway, W.C.2, or through any bookseller, price 1d. each. Inquiries should be addressed to the Controller of Sulphuric Acid, Ministry of Supply, 19, Berkeley Square, Bristol, 8.

Aluminium Control

The Minister of Aircraft Production has issued a Direction, which came into force on March 4th, under the Control of Aluminium (No. 5) Order, 1940, fixing the maximum price of aluminium alloy scrap, including any packing, loading and transport undertaken by the sellers, at £65 per ton.

An Inquiry from India

A firm of agents and importers in Bombay asks to be put into touch with manufacturers of electrical goods and accessories such as switches, meters, etc. It claims to have connections with electrical dealers in India and to be in a position to place large orders. We shall be glad to furnish the name of the firm to any interested readers.

Australian Tariff Decisions

Among recent decisions of the Commonwealth Department of Trade and Customs are that filaments, lead-in wires and supports for the manufacture of electric lamps shall be admitted free of duty under the British preferential tariff and that barretter valves should be subject to a duty of 5 per cent.

Switchgear for War Use

In connection with the note which appeared on page 350 of our issue of February 7th we are informed by Switchgear & Cowans, Ltd., that circuit-breakers of their manufacture have been designed in conjunction with proving tests which have been carried out at A.S.T.A. or N.P.L. stations up to 250 MVA rupturing capacity, and elsewhere at 500 MVA and up to 750 MVA.

Fatality

At an inquest on Edna Mary Jackson, 20, of Lower Kersal, recently conducted by the Salford Deputy Coroner, it was stated that the girl was found unconscious at the entrance to the Anderson shelter in the garden at her home. Her left hand was on an electric light switch. She died before she could be removed to hospital. Douglas Jackson, aged 23, brother of the girl, said that six months ago he fitted an electric light and fire in the shelter, although he had no training in electrical installation. The switch and plug were in a porch just outside the shelter and were not exposed to the weather. The installation had not been examined by any responsible official, but had given no trouble since it was fitted.

Richard Riley, a wiring foreman employed by the Salford Corporation Electricity Department, said he had examined the installation, and formed the opinion that it had been done by an amateur, who had tried to make as good a job of it as possible. The Deputy Coroner said it was evident that the girl's brother had not known enough about it to carry out the work of installation properly. People had been repeatedly advised to call in some responsible official to go over any work of this kind which they attempted, and it was important that they should heed the warning. A verdict of "Death by misadventure" was returned.

Rhodesian Copper Supplies

As one example of the Empire's war efforts, it is stated that new developments in the Northern Rhodesia copper mines will raise the output to over 300,000 tons a year by next January. Ten years ago the copper production was less than 10,000 tons a year but by the year ended September, 1939, the output had reached 211,000 tons valued at about £9 million. Since the outbreak of war the copper producers have been selling the greater part of their output to the Ministry of Supply at a price near that which ruled immediately before the war and the contract has been renewed for 1940/41.

Changes of Address, etc.

Brown Bros., Ltd., have re-opened their Southampton branch at Banister Road. The telegraphic address is "Imbrowned, Southampton" and the telephone number will be announced shortly.

The telephone number of Partridge, Wilson and Co., Ltd., Davenset Works, Evington Valley Road, Leicester, is now Leicester 25291/3.

The telephone number of James Kilpatrick and Son, Ltd., Kelvin House, River Cart Walk, Paisley, has been changed to Paisley 4264/6.

Technical Books Service

The National Book Council, of which Mr. John Masefield, O.M., is president, has issued a portfolio containing two carefully selected lists of books on subjects relating to factory production, processes, machines and tools. It has been circulated to about 5,000 mechanical and engineering firms asking them to bring the matter to the attention of their employees, and it is proposed to issue supplementary lists four or six times a year. Further information or copies of the lists can be obtained from the Secretary of the Council, 3, Henrietta Street, London, W.C. 2.

Aircraft Identification

Flight aircraft identification charts have been entirely modernised and new types of aircraft introduced. The British chart includes six new types of aircraft including newcomers from the U.S.A. now in service. To the companion chart depicting German aircraft one or two new types have been added. A novelty is a transparent, pocket identification chart of German aircraft comprising eighteen semi-silhouettes and forty-one line diagrams printed on two celluloid cards. Each of these charts can be obtained from the offices of *Flight*, Dorset House, Stamford Street, London, S.E.1. or through booksellers and newsagents at the price of 1s., plus 6d. for postage.

Trailer Fire Engines

Coventry Climax Engines, Ltd., tell us that nearly 10,000 of their "Godiva" trailer fire engines are now in service with regular and private fire brigades and the A.F.S.

Canadian Radio Receiver Sales

According to "Agricultural and Industrial Progress in Canada," published by the Department of Immigration and Colonization of the Canadian Pacific Railway, sales of radio receiving sets in Canada increased approximately 70 per cent. in the first half of 1940. Sales of receivers by Canadian producers totalled 157,440, while in the first half of 1939 they numbered 92,968; sets produced totalled 235,328, as against 101,800. The total sales in 1939 set a new high record at 370,568. The number of radio receiving licences issued in the last fiscal year, which ended March, 1939, was 1,345,157. Imports of sets rose, on the six-month comparison, from 5,641 to 7,727, while imports on tourists' permits advanced from 18,246 to 21,838. Valve imports rose from 345,672 to 671,674; production by Canadian manufacturers advanced from 977,567 to 2,303,738.

New Catalogues and Lists

A. Reyrolle & Co., Ltd., Hebburn-on-Tyne.—Pamphlets on flameproof air-break switchgear (No. 1056/9.40), "Reylovolt" low-voltage transformers for portable lighting (No. 887/9.40), Holmes variable-speed AC motors (No. 1090/2.40), and light-current arc welders (No. 1093, 1097 and 1098/2.40).

Medical Supply Association, Ltd., 167-173, Gray's Inn Road, London, W.1.—The third edition of the company's illustrated catalogue of electro-therapy equipment, containing details of several new and modernised equipments.

James Smellie, Ltd., Oxford Street, Dudley.—Folder 76, giving the latest prices of metal fireplace surrounds, including inset electric models.

Anderson, Boyes & Co., Ltd., Motherwell, Scotland.—Well-illustrated booklets describing belt and chain type gate-end loaders and the "Fifteen" electric shaker-conveyor.

TRADE MARK APPLICATIONS

AMONG recent applications received for British trade marks are the following, objections to which may be entered within a month of the dates shown:—

February 26th.

Priory. No. 612904, Class 8 (IV) Various hand tools, all without cutting edges, including electricians' and linesmen's tools.—Smith Francis Tools, Ltd., Priory Works, 68-70, Cheapside, Birmingham, 12.

March 5th.

Eclipse (design). No. 608,248. Class 7 (IV). Starting machinery for aircraft (not being parts of aircraft), electric generators, electric motors, electric alternators, ignition apparatus for internal combustion engines, etc. — Bendix Aviation Corporation, 30, Rockefeller Plaza, New York. Address for Service is, c/o Barker, Brettell & Duncan, 75 & 77, Colmore Row, Birmingham, 3. To be associated with No. 532,632 (2842) viii and others.

Ellain. No. 613,857. Class 17 (IV). Electric insulating material, electric insulators and insulation parts.—Geo. Bray & Co., Ltd., Bagby Works, Leicester Place, Blackman Lane, Leeds.

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the following:—

ASTRON boiling ring

Warm water anti-gas eye-cleaner by means of small hose and jets combined with water heating equipment; temperature about 60 deg. F.

Present address of Tarrant Electric Co.

Minor African Markets

Immediate Prospects for Electrical Goods Uncertain

In certain of what may be termed the minor markets of Africa there has been a set-back in import trade during the past two years. West Africa has suffered from depression in the demand for some of its principal crops, notably cocoa and, more recently, from difficulty in obtaining sufficient shipping space. On the other hand mining activity has to some extent compensated for decline in sales of other products of the soil in West Africa and Rhodesia, as in the Union. Many restrictions on import trade have been introduced.

Among the markets which it is proposed to review, Southern Rhodesia is the most important to the exporter of electrical goods. The Electricity Supply Commission of that territory has been able to report good progress among the undertakings it represents. During the year ended March 31st, 1940, the sales of electricity rose by over 100 per cent., from nearly 30 million kWh to over 60 million kWh, while revenue increased from £140,000 to over £212,000, or 85 per cent. The total horse-power connected to the Commission's system from all sources was approximately 35,000. During 1940-41 it is estimated that the revenue will exceed £300,000 and that the output will reach 95 million kWh.

In announcing these results, the Minister of Finance said there was ample scope for further progress, but that this could be achieved only by installing additional generating plant, and this again was dependent on the international situation. The Government, he added, had every reason to be satisfied with the rapid development in the supply of power to the mining, farming and other industries at low cost to the users.

There has been further evidence of the steadiness of the demand for power in the call for tenders for a 10,000-kW turbo-generator for the municipality of Bulawayo.

The trend of foreign trade in 1940 was for imports to diminish slightly and exports to increase to a marked extent. The output of gold and base metals was well in advance of 1939. Additional attention is being given to the development of secondary industries, the value of whose output is already rather more than half that of the mineral output of Southern Rhodesia. The value of the output of metal manufactures in 1939 was a third more than in the preceding year. A commission has been appointed to consider the advisability of promoting further factory industries.

The recent Budget statement of Kenya revealed the country's healthy financial condition. Instead of an estimated deficit for 1940 of £51,000 there was a surplus of £100,000 for presentation to the Home Government. The Governor announced that a War Risks Insurance Bill, in which Uganda was a partner, would be enacted as quickly as possible.

As a result of the recent economic conference at Delhi, representing countries east of Suez, the East African Governors' Conference has agreed to the introduction of the machinery recommended by the East African Economic Council for closer co-ordination of the policies of Kenya, Tanganyika, Uganda and Zanzibar in purchasing and selling commodities. There will be set up an East African Civil Supplies Board, representative of all four territories, which will deal with matters affecting the control of imports, currency, exchange and supplies for civil needs.

In view of the difficulties in the way of shipping the West African cocoa crop to Britain, steps are being considered for storing the better quality of this season's crop locally. It is believed that two-thirds of the yield could be dealt with in this manner, and favourable influence on West African trade generally is expected to result from the economic agreements with the Free French and Belgian Colonial Governments, covering the purchase of the leading tropical products. In order to relieve the economic situation as much as possible, the people of Nigeria are being encouraged to make at home cocoa butter, chocolate, candles and soap from surplus or poor-quality cocoa beans.

Reporting recently on the market for electric refrigerators in the Gold Coast, the American Consulate at Lagos, Nigeria, said that when the restriction on the importation of American refrigerators was removed, there should be a small market for such equipment in all the British West African colonies. He attributes the preference which is shown for American refrigerators to their price and quality, the sizes in chief demand being the 4, 5 and 6 cu. ft. types.

The accompanying tables give the electrical imports of Southern Rhodesia, Kenya and Uganda, Tanganyika, Gold Coast, and Nigeria in 1939, with notes of increases or decreases on 1938. Countries of provenance also are shown, except for Nigeria, as this detail has not been made available for that country for 1939. All the figures have been extracted from the official returns of the respective territories.

SOUTHERN RHODESIA

	1939 £	Inc. or dec. on 1938 £
Electric wire and cable—		
Total	111,000	— 24,000
From United Kingdom	92,500	— 18,500
„ Canada	3,100	
Electric lamps—		
Total	20,300	— 1,100
From United Kingdom	16,200	— 1,600
„ United States	1,900	+ 600
Electrical material not elsewhere enumerated—		
Total	57,600	+ 17,100
From United Kingdom	29,900	+ 12,900
„ Canada	10,000	+ 2,500
„ United States	9,400	+ 2,800
Radio material & apparatus—		
Total	47,700	— 6,100
From United Kingdom	6,700	— 2,300
„ United States	23,700	— 400
„ Holland	15,900	— 1,900
Telegraph & telephone material & instruments—		
Total *	16,600	+ 13,600
Batteries—		
Total	22,100	+ 2,500
From United Kingdom	12,500	+ 900
„ United States	4,600	+ 400
Motors—		
Total	42,000	— 11,100
From United Kingdom	35,800	— 7,000
„ Germany	2,400	— 1,900
Transformers—		
Total	79,500	— 6,300
From Germany	8,400	+ 900
„ United Kingdom	69,800	— 7,200
Other electrical machinery—		
Total	121,000	— 114,000
From United Kingdom	100,300	— 78,700
„ United States	8,200	— 3,800
„ Germany	4,700	— 32,300

KENYA AND UGANDA

	1939 £	Inc. or dec. on 1938 £
Electric wire and cables—		
Total	23,600	— 22,100
From United Kingdom	18,500	— 19,500
„ Germany	1,000	— 3,000
„ Belgium	2,600	— 500
Lighting accessories & fittings—		
Total	17,300	— 12,900
From United Kingdom	8,500	— 13,500
„ Belgium	7,500	+ 2,600
„ Germany	900	— 1,700
Electric lamp bulbs—		
Total	5,200	— 3,400
From United Kingdom	4,000	— 2,700
„ Holland	500	— 200
Electrical goods & accessories not elsewhere specified—		
Total	30,900	— 900
From United Kingdom	20,000	— 3,000
„ United States	3,000	+ 200
„ Germany	4,400	+ 1,200
*Telegraph & telephone material *—*		
Total	33,000	— 8,000
Radio apparatus—		
Total	26,300	+ 1,300
From United Kingdom	7,400	— 3,400
„ Holland	10,300	+ 3,700
„ United States	7,400	+ 900
Electrical machinery & parts—		
Total	51,000	— 15,200
From United Kingdom	22,500	— 27,900
„ Belgium	23,900	+ 13,500
„ United States	3,000	+ 1,300

TANGANYIKA

	1939 £	Inc. or dec. on 1938 £
Electric light bulbs—		
Total	2,500	+ 380
From United Kingdom	1,100	+ 300
„ Germany	800	+ 200
Insulated wires & cables—		
Total	5,600	— 9,600
From United Kingdom	4,400	— 1,300
„ Germany	900	— 8,100
Electrical wires & cables, uninsulated—		
Total *	1,000	— 100
Telegraph & telephone instruments & apparatus—		
Total *	2,400	— 400
Radio apparatus—		
Total	11,300	+ 2,000
From United Kingdom	4,700	+ 2,400
„ United States	3,100	— 200
From Germany	1,200	+ 100
„ Holland	2,100	— 300
Electrical goods & apparatus not elsewhere specified—		
Total	17,600	— 1,400
From United Kingdom	12,300	+ 1,700
„ Germany	4,100	— 2,400
Electrical machinery & parts—		
Total	22,600	— 16,400
From United Kingdom	11,300	— 6,500
„ Germany	5,500	— 13,900
„ United States	5,100	+ 4,300

* Mainly from U.K.

GOLD COAST

	1939 £	Inc. or dec. on 1938 £
Radio sets—		
Total	2,700	+ 900
From United Kingdom	1,200	+ 200
„ United States	800	+ 500
„ Holland	500	+ 150
Radio parts—		
Total	4,600	— 9,100
From United Kingdom	4,300	— 9,100
Other telegraph & telephone apparatus—		
Total	8,800	— 6,700
From United Kingdom	8,200	— 6,800
Other electrical apparatus—		
Total	105,000	— 19,000
From United Kingdom	98,000	— 14,000
„ Germany	2,700	— 1,000
„ United States	3,900	— 1,600
Electrical machinery—		
Total	164,000	— 43,000
From United Kingdom	158,000	— 46,000
„ United States	3,700	+ 3,400

NIGERIA

	1939 £	Inc. or dec. on 1938 £
Radio sets	7,500	—
Radio parts	3,800	— 1,800
Other telegraph & telephone apparatus	7,800	+ 4,300
Other electrical apparatus	63,000	— 24,800
Electrical machinery	24,000	— 23,600

ELECTRICITY SUPPLY

Opposition to Grampian Scheme. Road Damage Repair Costs

Barrow-in-Furness. — EXTENSIONS. — The Corporation Electricity Committee is to extend mains in the Central Drive area at a cost of £716. A supply is also to be provided to Rock Cottages, Swarthmoor, at a cost of £26 and to premises in Rawlinson Street, at a cost of £313.

LOANS. — The Corporation Electricity Committee is applying for sanction to borrow £3,000 for mains and services and £2,000 for substation equipment.

Birkenhead.—NEW TRANSFORMER.—The Corporation Electricity Committee is to install a 5,000-kVA transformer with switchgear and cables at a cost of £3,798 for dealing with the load in the Eastham and Southern Wirral districts.

TRANSFORMERS AND MAINS. — For protective purposes the Corporation Electricity Committee is to purchase eight additional spare transformers at an estimated cost of £1,794 and provide additional link mains at a cost of £3,672. A 6,600-V rising main is to be looped at a cost of £948.

SHELTER INSTALLATIONS.—The Education Committee is to heat and light school shelters by electricity at a cost of £1,400.

Brentford and Chiswick.—SHELTER HEATING.—The borough electrical engineer has been instructed to proceed with electrical heating installations in all school shelters and in public shelters where "Cura" stoves have not yet been fitted, or supplied for fitting. A two-part tariff has been adopted for shelters with a fixed charge of 1s. per quarter per person, plus ¾d. per kWh consumed.

Burnley.—LOAN FOR COOKERS.—The Corporation is applying to the Electricity Commissioners for sanction to borrow £1,500 to meet anticipated expenditure on appliances (cookers) during the period ending March 31st, 1942. On June 5th, 1940, sanction to borrow £30,000, to cover expenditure on wiring installations and electrical appliances from April 1st, 1939, was received. Of this figure £4,000 devoted specifically to cookers has now been exhausted.

Cheltenham.—SUPPLY ARRANGEMENTS. — At a recent meeting of the Corporation Electricity Committee the borough electrical engineer reported further with regard to the provision of a new truck feeder and recommended a new route which would provide alternative supply in case of war damage. This would entail the provision of two cables instead of one and the total cost would be £25,776. It was decided to seek a grant toward the additional cost involved by arranging for the security of the undertaking.

Chester.—SHELTER LIGHTING.— The Corporation Emergency Committee has approved an estimate of £1,946 of the electrical engineer for lighting communal shelters.

Downham.—UNDERGROUND CABLES.— The Rural District Council has granted permission to the East Anglian Electric Supply Co., Ltd., to lay underground cables.

Glasgow.—MAINS EXTENSIONS.—Special extensions of distributing mains are to be laid by the Corporation Electricity Committee at a cost of £4,947.

Huddersfield.—TRANSFER TO RATES.—A sum equal to 1½ per cent. of the outstanding debt of the electricity undertaking is to be transferred out of the surplus for the year ended December 31st, 1940, as a contribution to the general rate.

CONCESSION FOR BOMBED PREMISES.— In the event of consumers' premises being rendered uninhabitable by enemy action for a period of not less than one week, payment of fixed charges under the two-part tariff and charges for simple hire of apparatus are to be waived. Instalments on hire purchase of apparatus are also to be postponed during the period the premises are uninhabitable, the minimum charge being reduced proportionately.

RIPPLE CONTROL.—Applications have been received by the A.R.P. authorities in Huddersfield from a number of business premises who wish to purchase "Ripplay" apparatus. The matter is receiving attention.

TRANSFORMER.—The borough electrical engineer recommends the purchase of a 300-kVA transformer for installation on premises in St. Thomas's Road.

Inverness.—GRAMPIAN COMPANY'S SCHEME. —The County Council has approved further action being taken in opposition to the Grampian Electricity Supply Coy.'s Provisional Order for impounding the waters of Glen Affric and Glen Cannich. It was agreed, on the recommendation of the Parliamentary Bills and Law Committee, to prepare evidence to be led at the inquiry which is to be held into the Order, and the Committee was authorised to take all necessary steps for the presentation of the Council's case against the scheme. In the discussion it was revealed that the electricity generated under the scheme was to be used in the promoters' existing areas, the works were not to proceed during the period of the emergency, and there was no Government backing for the Order so far as war purposes were concerned. The scheme was not contemplated as part of a larger scheme, but there was no guarantee, it was stated, of any surplus not going to the grid. The County Clerk, stated that Sir Murdoch Macdonald, M.P. for the County, had written Lord Reith, Minister of Works and Buildings, regarding the scheme.

Johnstone (Renfrewshire).—STREET LIGHTING.—The Town Council is to borrow £1,700 for street lighting.

Keighley.—LOAN FOR MAINS.—The Corporation Electricity Committee has obtained sanction to borrow £5,000 for mains and services.

Kettering.—ELECTRICITY CHARGES.—The Town Council has adjourned consideration of the question of a general increase in electricity charges pending the submission of the electricity accounts for the year ending March 31st.

Utilities and Road Re-instatement

UNDER a decision of the London Civil Defence Region it is now the practice for highway authorities in the area to bear the cost of re-instatement of bomb craters in roads as well as the cost of any other road opening which is considered necessary by a public utility to enable subsurface works to be inspected.

Outside the London Region, however, many highway authorities have refused to follow this practice and accordingly the Conjoint Conference of Public Utility Associations has asked the Ministry of Home Security to make the London ruling apply throughout the country. The Conjoint Conference recommends to its constituents that, until a decision on the point has been received from the Ministry, they should withhold payment for the re-instatement of bomb craters or any road openings considered necessary for inspection purposes.

London. — STEPNEY. — For the twelve months ended March 31st last the Electricity Department shows a net deficit of £20,284, as compared with a net surplus of £9,791 in 1938-39. The deficit would have been greater but for the fact that income-tax fell from £24,034 to £5,853, due to the change of method in dealing with certain properties of the undertaking assessed under Schedule "A." This change, which is in accordance with Section 15 (3) of the Finance Act, 1937, has been allowed by the income tax authorities, but Mr. A. E. Campbell, the borough electrical engineer and manager, states in his report that the Commissioners of Inland Revenue contemplate an application to the Court to test the validity of the contention that this provision is applicable to properties of electricity undertakings. Total sales of electricity, excluding those to the Central Electricity Board, amounted to 103,205,728 kWh, as compared with 110,853,733 kWh, the gross revenue declining from £565,668 to £522,456 and the gross profit from £181,393 to £131,278.

SOUTHWARK.—The following tariff has been introduced for electricity supplied to air-raid shelters where ventilating and heating units and plug points for tea-making have been installed, as an alternative to the flat rate for lighting of 4d. plus 25 per cent. per kWh and the sliding scale for heating commencing at 2d. plus 25 per cent. per kWh. :— An annual fixed charge of 4s. per person of seating capacity, made at the rate of 1s. 3d. per quarter for the two winter quarters and 9d. per quarter for the summer quarters, plus a "unit" charge of ¼d., subject to a coal clause of 0.001d. per penny rise or fall in the basis cost of coal of 16s. per ton. At present the price of coal is 31s. per ton, making an increase of 0.18d. above 0.5d., or a total running charge of 0.68d. The tariff is to be applied retrospectively to existing shelters where heating and ventilating units have recently been installed and also in cases where the unauthorised use of fires on lighting circuits has temporarily been made by members of the public.

Mansfield.—LOAN.—The Corporation Electricity Committee is seeking sanction to borrow £2,500 for mains and services.

Oldham.—HEATING OF GYMNASIUM.—The Education Committee is to obtain comparative estimates for heating the gymnasium at Waterloo Council School by low-pressure hot water apparatus and tubular heaters.

Padiham.—CONTRIBUTING TO RATES. — Despite the fact that after meeting tax and other charges the accounts of the electricity undertaking show a net loss of £69, a sum of £428, equivalent to 1½ per cent. of outstanding debt, has been transferred to relief of rates. There remains a balance on the net revenue account amounting to £868, the reserve fund standing at £3,158. Last year 1,466,239 kWh of electricity was sold to 2,478 consumers.

Plymouth.—YEAR'S WORKING.—Although at the beginning of the year the Electricity Committee had estimated a deficit of £24,583 on the city's electricity undertaking, a net surplus of £7,920 is reported. The gross income was £362,286 and the expenditure £354,366.

Salford.—LOAN FOR APPARATUS.—The Corporation Light, Heat and Power Committee is seeking sanction to borrow £4,000 for consumers' apparatus.

Sheffield.—MAINS EXTENSIONS.—The Corporation Electricity Committee is to extend mains at a cost of £505.

Southport.—LOAN.—The Electricity Committee is to make application to the Electricity Commissioners for consent to the payment out of surplus revenue of £3,600 in respect of switchgear at eight substations. In addition, is applying for consent to borrow £6,500 for the purchase of additional equipment following the engineer's report on the heavy load on certain of the cable networks.

Sunderland.—INCREASED CHARGES.—Owing to increased coal charges the Electricity Committee has recommended the Town Council to increase electricity charges. The increases will range from about 1d. a week on the lighting tariff and about 2½d. on the domestic tariff. Increased coal charges will mean an extra £16,784 on costs of production and about £11,000 of this will be recovered from electricity consumers.

Wallasey.—PRICE INCREASES.—The Corporation Electricity Committee has increased charges for lighting from 3½d. to 3.6d. per kWh up to 500 kWh a quarter, and for heating and cooking from ¾d. to 1d. per kWh.

Watford.—WAR DAMAGE CONCESSION.—With regard to applications for reductions in electricity charges in cases where reduced assessments may be made as a result of war damage, the Corporation Electricity Committee recommends that the present rateable value of the premises in such cases should be taken as the basis for computing electricity charges.

York.—LOAN APPLICATION.—The Corporation Electricity Committee is seeking sanction to borrow £13,350 for h.v. feeders, £5,718 for l.v. feeders, £1,405 for buildings, £675 for cables, £12,993 for switchgear, £5,150 for transformers and £550 for rectifier.

Overseas

Australia.—NEW SOUTH WALES.—Recommendations to proceed with the proposed Snowy River hydro-electric scheme are to be made to the New South Wales Government. *Tenders* states that the work would include the building of a dam and construction of a tunnel 14 miles long. The total cost of the scheme is estimated at £10,600,000.

Canada.—WINNIPEG DISTRIBUTION SYSTEM NEGOTIATIONS.—Postponement of negotiations between the Winnipeg City Hydro and the Winnipeg Electric Co., relating to the purchase by the former of the company's electrical distribution system within the city, is now suggested. In a letter to the Civic Utilities Committee, Mr. J. G. Glassco, manager of the former concern, asked that the negotiations should wait until the pending discussions between the city and company regarding a new traction franchise were disposed of.

TRANSPORT

Coventry.—DISCONTINUANCE OF TRAMWAY SERVICES.—The Corporation Transport Committee recommends the complete discontinuation of the remaining tramway services.

France.—PARIS UNDERGROUND LINES REOPENED.—*Modern Transport* states that, according to reports from Vichy, services have been restored on 157 km. of the Paris underground railway system. Approximately forty stations on the underground system are still closed.

Manchester.—TRAMS TO BE SCRAPPED ?—Faced with a loss of nearly £100,000 next year on the operation of the trams, the City Council is considering scrapping them.

Sheffield.—TUBE PROPOSAL.—According to *Modern Transport*, traffic congestion and the provision of deep air-raid shelters have brought about a revival of a proposal by Mr. J. A. Hewitt to withdraw all bus and tram services from the centre of the city and link their terminals at the edge of the central area by an underground railway.

RADIO AND TELEPHONY

Glasgow.—AUTOMATIC EXCHANGES.—The conversion of six telephone exchanges to direct automatic working took place in Glasgow on March 1st. The scheme, which has cost over £2,000,000, and involved the building and re-equipment of new exchanges, affects 42,000 of the 108,000 telephones in the city. A representative gathering of citizens attended the official ceremony, when Lord Provost Dollan wished success to the new development. He foresaw big developments in the telephone in the Glasgow area, and said had it not been for the war the number of telephones would have been increased by at least a further 10,000.

Turkey.—TELEPHONE SYSTEM EXTENSION.—The Turkish Cabinet has approved the important five-year plan of the administration of the P.T.T. for the extension of the Turkish telephone system. An initial instalment of the extraordinary allocation of £T400,000 for the realisation of this plan has been paid, and work has commenced on the first year's section. This includes the development of the telephone system of Istanbul, the reinforcement of lines of communication with Europe, and the completion of the Sivas-Erzurum-Caucasus line, involving the construction of eleven automatic exchanges in nine large towns.

Tenders for the construction of these exchanges have been allotted, and it is anticipated that the exchanges will be in operation by May. The completion of the Sivas-Erzurum-Caucusus line will be made as soon as certain orders for materials from abroad are fulfilled. In addition to this programme, the administration of the P.T.T. has undertaken the construction of a telephone line from Tchorlu via Tekirdagh to Kechan and thence to Ipsala. The construction of this line is already well under way.

Shelter Heating

Results of E.D.A. Experiments at Fulham

TO place before the Ministry of Home Security further arguments for the employment of electric heating in air-raid shelters the British Electrical Development Association, with the co-operation of the Fulham Borough Council Electricity Department, recently arranged a practical demonstration to test the comparative merits of five different types of heater. In view of the low cost of the coal stoves which have been purchased by the Ministry, electric heaters of the simplest types were installed with the object of keeping capital cost within the limit of £8 per shelter. Each shelter was of the "50-person" size, and the heaters were installed during the cold weather in December.

Results of the experiments are given in the current issue of the *E.D.A. Bulletin*. It was found that the heaters had to be operated more or less continuously for about a fortnight before the walls and roof became thoroughly dry. The condition of the interior surfaces is probably at least as important as, if not more important than, the air temperature from the point of view of human comfort. In addition the temperature of the floor has considerable influence, especially when the occupants of the shelter are standing or sitting with their feet on the floor.

From this point of view, as well as to ensure a good distribution of warmth, the use of tubular heaters is advantageous. On the other hand a type of heater which has some luminous effect undoubtedly has a psychological appeal. In this respect a wall-type fire was very popular, but it is doubtful whether a fire of the ordinary type will be considered sufficiently safe even in shelters where the bunks are fixed in such positions as to allow some space around it.

After the shelters at Fulham were completely dried out, all the heaters installed proved capable of producing a temperature rise of at least 20 deg. F. when the outside air was at freezing point, and provided a sufficient degree of comfort for the occupants. The demonstration accordingly showed that either tubular heaters or convectors with a loading of approximately one watt per cubic foot, say 2-2½-kW per 50-person shelter are suitable for surface shelters.

As regards the unit type of heater consisting of a double fan and heater element arranged to discharge warm air in opposite directions, it is thought that in view of the limited number of fans which can be manufactured in wartime, this type should be employed only in trench and other underground shelters where there is more need for positive ventilation, and where the heat losses from the structure are less than in the case of surface shelters.

An alternative arrangement is to install tubular heaters or convectors in the trench and provide positive ventilation by fixing plain extract fans in the escape hatches. Convection heating alone would, of course, dry out a trench and prevent condensation, but the provision of a fan ensures positive ventilation and healthier conditions.

As a result of the numerous demonstration installations arranged by the electrical industry, the Ministry of Home Security, whose officials, let it be said, always preferred electricity to any other means of heating, became satisfied that electric heating installations for shelters could be provided at reasonable cost. Official approval would have been given early in January but at that time the responsibility for shelter conditions was suddenly transferred to the Ministry of Health. The latter Ministry may reasonably be expected to prefer the cleanliness and other advantages of electric heating, but financial and other policy considerations may account for some further delay before official approval and the amount of grant to be paid from national funds are announced.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specifications (1s. each) can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2

1939

16051. "Ultra-short wave devices." British Thomson-Houston Co., Ltd. June 1st, 1938. (533500.)

17485. "Electric communication systems." Siemens Bros. & Co., Ltd. and A. Rosen. June 15th, 1939. (533566.)

19642. "Frequency modulated radio signal transmitters." E. C. Cork and J. L. Pawsey. July 6th, 1939. (533289.)

22334. "Electrical socket contact." E. Frank. August 1st, 1939. (533432.)

22335. "Multiple-contact electric sockets." E. Frank. August 1st, 1939. (533433.)

22423. "Cleaning of rotors of dynamo-electric machines." British Thomson-Houston Co., Ltd. August 3rd, 1938. (533359.)

22847. "Hysteresis or synchronous motors." General Time Instruments Corporation. October 29th, 1938. (533507.)

22859. "Sound-transmitting devices." Vokes, Ltd. October 18th, 1938. (533508.)

22896. "Switch-operating gear for electrical machinery for use in mines and other places where there is dust, for example, electric coal and stone drills." British Engines, Ltd., and H. T. Lamb. August 8th, 1939. (533293.)

22898. "Portable electric drills." British Engines, Ltd., and H. T. Lamb. August 8th, 1939. (533295.)

22979. "Magnetic deflecting systems for cathode ray tubes." Standard Telephones & Cables, Ltd., and C. N. Smyth. August 9th, 1939. (533301.)

22981. "Electric signalling systems." Standard Telephones & Cables, Ltd., R. A. Meers, and E. R. Cockbain. August 9th, 1939. (533360.)

23010. "Electrodes for electric cells." D. F. D. Gemmel, J. D. Gilbert and Ferguson Battery Co., Ltd. August 9th, 1939. (Addition to 429840.) (533512.)

23013. "Production of bright surfaces on copper and its alloys." British Thomson-Houston Co., Ltd. August 10th, 1938. (533442.)

23014. "Automatic control systems for dynamo-electric machines driving or controlling winding means for strip material." British Thomson-Houston Co., Ltd. August 11th, 1938. (533302.)

23034. "Translating mechanisms for translating electric signals." Deutsche Hollerith Maschinen Ges. August 10th, 1938. (533305.)

23088. "Electric coupling devices." Rotax, Ltd., and A. Massey-Allen. August 10th, 1939. (Cognate application, 27659/39.) (533310.)

23122. "Heat-resisting glass." British Thomson-Houston Co., Ltd., and J. E. Stanworth. August 10th, 1939. (533361.)

23181. "Controlling means for electric pumps." W. Seck. August 11th, 1939. (533574.)

23219. "Insulating material of electric cables and joints thereof." Enfield Cable Works, Ltd., and R. C. Milner. August 11th, 1939. (533444.)

23226. "Magnetic arc blow-out." Automatic Control Corporation. August 15th, 1938. (533445.)

23227. "Regulating transformer." F. Schenk and G. Leischner. February 10th, 1939. (Cognate application, 23228/39.) (533524.)

23232. "Ignition devices for internal combustion engines." British Thomson-Houston Co., Ltd., and J. H. Pollard. August 11th, 1939. (533314.)

23238. "Couplings for shielded electric cables." A. A. C. Degen, and Plessey Co., Ltd. August 11th, 1939. (533368.)

23239. "Couplings for shielded electric cables." A. A. C. Degen and Plessey Co., Ltd. August 11th, 1939. (533514.)

23274. "Adjustable electric condensers." Kolster-Brandes, Ltd., and K. G. Smith. August 11th, 1939. (533370.)

23280. "Teleprinter exchange systems." Standard Telephones & Cables, Ltd., G. C. Hartley, and G. A. M. Hyde. August 11th, 1939. (533371.)

23318. "Electric vibratory motors." H. List. August 15th, 1938. (533448.)

23333. "Traffic signalling systems." Automatic Telephone & Electric Co., Ltd., and G. W. Thompson. August 12th, 1939. (533449.)

23404. "Electric gas blast switches." British Thomson-Houston Co., Ltd. August 12th, 1938. (Addition to 504556.) (533577.)

23449. "Electric cable joints." Callender's Cable & Construction Co., Ltd., A. N. Arman, K. S. Brazier, and D. T. Hollingsworth. August 14th, 1939. (533372.)

23534. "Means for operating electric shaving apparatus." Masteradio, Ltd., and D. Noble. August 15th, 1939. (533373.)

23711. "Electrical insulating materials." Pirelli-General Cable Works, Ltd., and H. Barron. August 17th, 1939. (533520.)

23824. "Methods and apparatus for measuring electrical power." Marconi's Wireless Telegraph Co., Ltd., and J. M. Young. August 18th, 1939. (533591.)

24293. "Electric discharge devices." British Thomson-Houston Co., Ltd. August 26th, 1938. (533451.)

24702. "Wireless signalling apparatus or other apparatus employing radio frequency methods." G. Hodges. August 28th, 1939. (533453.)

24925. "Electric furnaces." Electric Furnace Co., Ltd., and C. W. Presland. August 30th, 1939. (533454.)

24926. "Cable terminations and joints." Callender's Cable & Construction Co., Ltd., and H. Shuttleworth. August 30th, 1939. (533380.)

24996. "Wireless receiving sets." Philips Lamps, Ltd. September 3rd, 1938. (533315.)

25008. "Valves." British Thomson-Houston Co., Ltd. August 31st, 1938. (533527.)

26092. "Arc welding apparatus." British Thomson-Houston Co., Ltd. September 16th, 1938. (533529.)

26755. "Arrangements for rendering fluid tight shafts or spindles." J. Fowler, and Metropolitan-Vickers Electrical Co., Ltd. September 27th, 1939. (533384.)

26896. "Driving systems for electrically driven road and rail vehicles." Akt.-Ges. Brown, Boveri & Cie. October 17th, 1938. (533455.)

27267. "Reactor control of electric current." H. F. Vickers. February 9th, 1939. (533318.)

27315. "Method of joining electric cables." E. Lake, Ltd., and E. E. Parker. October 6th, 1939. (533532.)

27758. "Excitation arrangements for motor generator set with flywheel equalisation." British Thomson-Houston Co., Ltd., and H. W. C. Liddiard. October 12th, 1939. (533387.)

27866. "Means for improving commutation in dynamo-electric machines." English Electric Co., Ltd., and W. E. M. Ayres. October 13th, 1939. (533598.)

28236. "Water heaters." General Electric Co., Ltd., R. Harvey and A. E. Sarson. October 19th, 1939. (533388.)

28468. "Selective protecting systems for electrical networks." U. Hecht and Allmanna Svenska Elektriska Aktiebolaget. October 23rd, 1939. (533322.)

28609. "Electrical oscillation generators." Fides Ges. für die Verwaltung und Verwertung von Gewerblichen Schutzrechten. October 26th, 1938. (533605.)

28670. "Manufacture of bushings, cylinders, tubes, and the like for electrical purposes." P. G. Ashley, M. J. Cradick, A. R. Dunton and Metropolitan-Vickers Electrical Co., Ltd. October 25th, 1939. (533545.)

28815. "Electric rectifying arrangements for supplying load circuits at different voltages." British Thomson-Houston Co., Ltd. October 29th, 1938. (533612.)

28831. "Circuits employing discharge valves." Standard Telephones & Cables, Ltd. November 17th, 1938. (533613.)

28892. "Apparatus for undercutting the mica insulation in the commutators of electric motors and the like." R. C. Globe. October 28th, 1939. (533328.)

28902. "Wall plug." P. Holme. October 28th, 1939. (Cognate application, 11954/40.) (533329.)

28979. "X-ray apparatus for measuring stress in metals." H. R. Priston and D. E. Thomas. October 30th, 1939. (533337.)

29021. "Telephone systems." General Electric Co., Ltd., and E. P. Fairbairn. October 31st, 1939. (533618.)

29023. "Switch devices operable by tilting electrical appliances or apparatus." A. Walker. October 31st, 1939. (Cognate application, 29024/39.) (533551.)

29031. "Fluid blast electric circuit breakers." British Thomson-Houston Co., Ltd., H. Trencham, and H. E. Cox. October 31st, 1939. (533341.)

29032. "High-frequency apparatus utilising electron discharge devices of the magnetron type." British Thomson-Houston Co., Ltd. November 1st, 1938. (533342.)

29051. "Synchronising system particularly applicable for telegraph distributors." Standard Telephones & Cables, Ltd. November 16th, 1938. (533347.)

29092. "Phase-delay devices suitable for multiplex telegraph systems." Marconi's Wireless Telegraph Co., Ltd. November 1st, 1938. (533352.)

29181. "Multiplex telegraph systems." Marconi's Wireless Telegraph Co., Ltd. November 1st, 1938. (533397.)

29229. "Tripping arrangement for operating mechanism of electric circuit breakers." General Electric Co., Ltd., and F. J. Keeley. November 2nd, 1939. (533398.)

29235. "Apparatus for thermal measurements." British Thomson-Houston Co., Ltd. November 2nd, 1938. (533399.)

29314. "Electron-discharge device amplifying circuits." Standard Telephones & Cables, Ltd. January 27th, 1939. (533626.)

29320. "Methods of, and apparatus for, the manufacture of hard metal alloys." British Thomson-Houston Co., Ltd. November 4th, 1938. (533627.)

29400. "Cathode-ray tubes." Mullard Radio Valve Co., Ltd. November 7th, 1938. (533409.)

29497. "Dielectric bodies for electric condensers, and methods of manufacturing them." Philips Lamps, Ltd. November 7th, 1938. (533419.)

29560. "Hand microtelephones." Stan-

(*Concluded on next page*)

FINANCIAL SECTION

Company News. Liquidations and Bankruptcies. Stock Exchange Activities

Reports and Dividends

International Combustion, Ltd.—In the course of his speech at the annual meeting on March 4th, Mr. G. R. T. Taylor (chairman), said that the works were employed at full pressure. The increase in the advances to subsidiary companies was due to heavy supplies made to the one in Australia, to enable it to execute large contracts, the completion of which was urgently required to augment the war effort of that Dominion.

The Midland Counties Electric Supply Co., Ltd.—The accounts for 1940 now published confirm the figures given in the preliminary statement recently issued. Trading profits of the undertakings owned and operated by the company, together with miscellaneous receipts of the company amounted to £1,062,436, and after payment of income-tax on earnings of the operating companies, to £834,367, as compared with £805,487 in the preceding year. Depreciation, renewals and reserves require £468,966, leaving a balance of £365,400 (against £375,804) being the revenue available to the company. Debenture and loan interest absorbs £37,281 and reserve receives £70,000. The final ordinary dividend is 5½ per cent., maintaining the distribution for the year at 8 per cent., less tax, and £20,696 is carried forward (against £16,354 brought in). The report states that the trading results of the electricity supply undertakings show a satisfactory increase, and the profits of the traction properties have been well maintained.

Bruce Peebles & Co., Ltd., report a profit for 1940, after providing for taxation and expenses of £31,037, as compared with £43,157 for the preceding year, to which is added £10,648 brought in. Depreciation absorbs £12,000, the preference dividend is 7½ per cent., with a bonus of 2½ per cent. (same), and the ordinary dividend is 5 per cent. (same) with a bonus of 3 per cent. (unchanged). The balance carried forward is £10,355.

The Northampton Electric Light & Power Co., Ltd., reports a net profit for 1940 of £137,485, as compared with £110,833 for 1939, which with £44,051 brought in makes £181,536 available. General reserve receives £10,000, war damage insurance reserve £25,000, and employees' benevolent fund £1,000. As already announced the final dividend on the ordinary stock is 6 per cent., again making 10 per cent., less tax, for the year, and £55,911 is carried forward.

The Rushden & District Electric Supply Co., Ltd., reports a net profit for the year ended December 31st, of £13,892, as compared with £11,013 for the previous year, to which is added £9,037 brought in. Reserve receives £1,500 and war damage insurance reserve £3,000. The final dividend is 5 per cent., making 9 per cent. for the year, and £10,330 is carried forward.

The City of London Electric Lighting Co., Ltd.—The full accounts for 1940, now issued, show a gross revenue of £856,377, as compared with £870,579 for 1939, and a net revenue of £77,079 (against £103,759), to which is added £106,010 brought in, making £183,089. As already announced the dividend on the ordinary stock for the year is 7 per cent. (including a payment of 1 per cent. from No. 2 reserve fund), as against 7½ per cent. for 1939, and £100,289 is carried forward.

The Llanelly & District Electric Supply Co., Ltd., reports a net profit for 1940 of £88,500, as compared with £79,315 for 1939. A sum of £5,000 is transferred to contingency account, and £43,704 is placed to depreciation and general reserve. The ordinary dividend for the year is maintained at 5½ per cent. and £1,262 is carried forward (against £1,140 brought in).

The Chesham Electric Light & Power Co., Ltd., reports a trading balance of £30,605 for 1940, as compared with £32,728 for 1939. The ordinary dividend for the year is 6 per cent., free of tax (against 6½ per cent. net), and the balance carried forward is £2,374 (against £820 brought in).

The Chipping Norton Electric Supply Co., Ltd., shows a trading balance for 1940 of £1,625, as compared with £1,968 for the previous year. Loan interest requires £298, and depreciation and reserve receives £1,234. The balance carried forward is £216 (against £124 brought in).

The Brentford Electric Supply Co., Ltd., reports a trading balance for 1940 of £16,594, as compared with £16,045 for the preceding year. The ordinary dividend is maintained at 6½ per cent., tax free, and £1,361 is carried forward.

The Scottish Power Co., reports profits for the year ended December 31st of £634,399, as compared with £657,393 for 1939. Of this £264,687 is appropriated on account of depreciation and reserves or carried forward in the accounts of the operating companies. The balance of revenue available is £369,711 (against £401,310). The final ordinary dividend is 5½ per cent., making 8 per cent. less tax, for the year (same), general reserve receives £35,000 and £133,085 is carried forward (against £147,981 brought in).

North Eastern Electric Supply Co.—The gross profit rose from £1,582,876 in 1939 to £1,680,772 last year and there was a net balance, after meeting debenture interest, taxation, etc., of £519,570 (against £521,321). The final dividend on the ordinary stock is 4½ per cent., maintaining the total for the year at 7 per cent. A balance of £221,583 is carried forward (against £220,689).

The Electrical Distribution of Yorkshire, Ltd., announces that the profit for 1940 was £245,856, as compared with £236,364 for 1939. The ordinary dividend is maintained at 9 per cent.; £110,000 (against £100,000) is transferred to depreciation and reserve; and £20,000 (against nil) is set aside for war insurance. £58,482 (against £61,652) is carried forward.

Waste Heat & Gas Electrical Generating Stations, Ltd., are again paying a final dividend of 5½ per cent., making 8 per cent. for the year.

The Mersey Power Co. reports a net revenue for 1940 of £187,148, as compared with £164,959 for 1939. As already announced, the ordinary dividend for the year is maintained at 8 per cent.

London Associated Electricity Undertakings, Ltd., reports that although only 4 per cent. has been earned it is proposed to pay 4½ per cent. on the ordinary stock for 1940, the balance being made up from stockholders' reserve. The distribution in respect of 1939 was 5½ per cent. of which 3 per cent. was paid as an interim dividend.

The Notting Hill Electric Lighting Co., Ltd., earned a gross revenue of £173,124 for 1940 (against £177,364); the net revenue was £28,606 (against £39,456). The result after paying debenture interest, etc., and crediting sums from the contingency fund is a debit balance of £2,723.

The Uxbridge & District Electric Supply Co., Ltd., reports a trading balance for 1940 of £137,165, as compared with £139,712 in 1939. An ordinary dividend of 5 per cent. free of tax is being paid, against 6½ per cent.

The Windsor Electrical Installation Co., Ltd., is raising its ordinary dividend from 5 to 6 per cent., free of tax. The trading balance fell from £18,777 to £16,802.

The Slough & Datchet Electric Supply Co. is also increasing its ordinary dividend from 5 to 6 per cent. free of tax. The 1940 profit was £49,566, against £41,443.

The Egham & Staines Electricity Co., Ltd., is reducing its dividend from 6½ per cent. to 5 per cent., free of tax, the trading balance having fallen from £99,151 to £89,000.

The British Columbia Power Co. is paying a quarterly dividend of 50 cents on the "A" shares (unchanged).

Crabtree Electrical Industries, Ltd., is maintaining its interim ordinary dividend at 5 per cent.

The Metropolitan Electric Supply Co., Ltd., has announced a final ordinary dividend

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New Patents (*continued from preceding page*)

dard Telephones & Cables, Ltd. (L. J. J. Schreiber, G. X. Lens, and S. M. Gelberg.) November 7th, 1939. (Addition to 501696.) (533462.)

29591. "High-frequency amplifiers including thermionic valves." General Electric Co., Ltd., and W, H. Aldous. November 7th, 1939. (Cognate application 13188/40.) (533558.)

29599. "Electrically driven shaving apparatus." Philips Lamps, Ltd. November 10th, 1938. (533467.)

29647. "Ventilating apparatus." Axia Fans, Ltd., and T. Wylie. November 8th, 1939. (533560.)

29670. "Electric discharge tubes." Mullard Radio Valve Co., Ltd. November 11th, 1938. (533471.)

29695. "Spot welding machines." Rubery, Owen & Co., Ltd., and A. Pedley. November 9th, 1939. (533472.)

29699. "Methods of making glass bulbs." British Thomson-Houston Co., Ltd. November 9th, 1938. (533473.)

29764. "Systems for transmitting a band of frequencies." Philips Lamps, Ltd. November 10th, 1938. (533475.)

29794. "Frequency modulation systems for carrier-wave signalling." British Thomson-Houston Co., Ltd. November 12th, 1938. (533479.)

29848. "Systems for modulating a carrier oscillation or for amplifying a modulated oscillation." Philips Lamps, Ltd. November 10th, 1938. (533485.)

29891. "Double installations for the projection of kinematographic pictures." Philips Lamps, Ltd. November 14th, 1938. (533488.)

29895. "Cable grips." H. Hope & Sons, Ltd., and B. E. Stanley. November 11th, 1939. (533491.)

31965. "Coated electrodes." Welding Supplies, Ltd. December 10th, 1938. 533562.)

1941

502. "Electric discharge lamps." British Thomson-Houston Co., Ltd. and H. R. Ruff. May 11th, 1939. (Divided out of (14080/39.) (533422.)

of 5 per cent. (against 7 per cent.), making 8 per cent. for the year (against 10 per cent.).

Taylor Tunnicliff (Electrical Industries), Ltd., are again paying a final ordinary dividend of 10 per cent., maintaining the distribution for the year at 12½ per cent.

Thos. W. Ward, Ltd., have declared an interim dividend of 3¾ per cent. (same).

The Telegraph Construction & Maintenance Co., Ltd., is paying a final ordinary dividend of 5 per cent., making 10 per cent., for 1940. This compares with 10 per cent. plus a capital bonus of 5 per cent. for 1939.

The British Power & Light Corporation, Ltd., has announced a final ordinary dividend of 4 per cent., making 6 per cent. for the year (against 7 per cent.).

The North Wales Power Co. is paying a dividend of 6 per cent. for 1940 (against 7 per cent.).

A. C. Cossor, Ltd., are paying an interim dividend of 5 per cent., less tax on the ordinary shares. No interim was paid in respect of the year ended March 31st, 1940, but the distribution for the year was 15 per cent.

The Shawinigan Water & Power Co. reports a gross revenue of $17,064,714 against $15,133,527) and a net income before meeting income tax and depreciation of $5,404,941 ($4,523,826). The total dividend for 1940 is maintained at 90 cents. per share.

The Midland Electric Manufacturing Co., Ltd., is again paying an ordinary dividend of 10 per cent., plus a bonus of 15 per cent. for 1940.

The Bombay Telephone Co.—A *Reuter* message from Bombay states that an offer to purchase all the shares of the company at Rs. 89 annas 15 per share has been made by the Indian Government following its decision to take over the working of the company. The directors have recommended acceptance of the offer.

The Consolidated Signal Co., Ltd., which has a large holding in the Westinghouse Brake & Signal Co., reports a profit for 1939-40 of £22,318 (against £25,441). The ordinary dividend is maintained at 17 per cent.

The Globe Telegraph & Trust Co. has announced a quarterly dividend of 1¼ per cent. (same).

New Companies Registered

Transformer & Electrical Co., Ltd.—Private company. Registered February 25th. Capital £500. Objects: To carry on the business of manufacturers of, and dealers in, dynamos, motors, meters, batteries, insulators, &c. Directors: W. M. Shanks and C. N. Burnham, both of Ashford Works, Ashford Road, South Woodford, E.18. Registered office: Ashford Road, Woodford, E.18.

F. & R. Freud, Ltd.—Private company. Registered February 26th. Capital £500. Objects: To carry on the business of manufacturers of electric lamps, bulbs, valves, neon signs, ultra violet ray apparatus, medical instruments and electrical and radio accessories, moulders of plastic articles, radio and television manufacturers, etc. Directors: F. Freud and R. Freud, both of 25, Arthur Court, Queen's Way, W.2. Registered office: Cliffords Inn, Fleet Street, E.C.4.

Syncrodynamic, Ltd.—Private company. Registered February 27th. Capital £1,000. Objects: To carry on the business of manufacturers of and dealers in scientific instruments and appliances, wireless apparatus, etc. Subscribers: E. J. Fearn, 47, Clarendon Way, Chislehurst, and J. Joseph, 15, Grovelands Road, Purley, Surrey.

Fred Fowler, Ltd.—Private company. Registered February 25th. Capital, £500. Objects: To carry on the business of general and electrical engineers, &c. Directors: F. Fowler, 68, Hurdis Road, Shirley, Birmingham; and E. L. Jones, 52, Newhall Street, Birmingham.

Roland Engineering Co., Ltd.—Private company. Registered February 14th. Capital £1,000. Objects: To acquire the business of a mechanical and electrical engineer carried on by J. W. Hambridge as the "Roland Engineering Co." at Sunningdale Avenue, Coventry. Directors: V. Hambridge and J. W. Hambridge (chairman and managing director), both of 20, Roland Avenue, Coventry. Secretary: V. Hambridge. Registered office: Sunningdale Avenue, Coventry.

Companies' Returns

Statements of Capital

Young Accumulator Co., Ltd.—Capital, £225,000 in 2,250,000 ordinary shares of 2s. each. Return dated September 4th, 1940. 1,934,792 shares taken up. £162,530 17s. 4d. paid. £30,948 6s. 8d. considered as paid. Mortgages and charges: £18,000.

Miller Bros. (Doncaster), Ltd.—Capital £500 in £1 shares. Return dated October 2nd, 1940. All shares taken up. £500 paid. Mortgages and charges: Nil.

Bognor Regis Rediffusion Service, Ltd.—Capital £10,000 in 10,000 ordinary shares of £1 each. Return dated July 15th, 1940. 7,500 shares taken up. £7,500 paid. Mortgages and charges: Nil.

Pye, Ltd.—Capital, £335,200 in £150,000 preferred ordinary stock and £185,200 deferred ordinary stock. Return dated August 22nd, 1940. All stock taken up. £178,500 paid on £150,000 preferred ordinary and £28,500 deferred ordinary stock. £156,700 considered as paid on £156,700 deferred ordinary stock. Mortgages and charges: Nil.

J. H. Graham & Son, Ltd.—Capital, £1,000 in £1 shares. Return dated September 2nd, 1940. 864 shares taken up. £864 paid. Mortgages and charges: Nil.

Johnson & Turner, Ltd.—Capital, £2,000 in £1 shares. Return dated September 2nd, 1940. 1,000 shares taken up. £700 paid. £300 considered as paid. Mortgages and charges: Nil.

The Nigerian Electricity Supply Corporation, Ltd.—Capital £545,000 in £1 shares. Return dated August 13th, 1940. All shares taken up. £450,076 paid. £94,924 considered as paid. Mortgages and charges: £251,127.

Watliff Co., Ltd.—Capital £15,000 in 3,000 ordinary and 12,000 preference shares of £1. Return dated September 17th, 1940. All shares taken up. £14,880 paid. £120 considered as paid. Mortgages and charges: £9,500.

British Home & Office Telephone Co., Ltd.—Capital £10,000 in £1 shares. Return dated September 6th, 1940. 5,230 shares taken up. £5,230 paid. Mortgages and charges: Nil.

Continental Hydro-Electric Co., Ltd.—Capital £20,000 in £1 shares. Return dated March 21st, 1940 (filed February 1st, 1941). 5,000 shares taken up. £5,000 paid. Mortgages and charges: Nil.

Johnson & Co. (Bradford), Ltd.—Capital £1,000 in 500 ordinary and 500 preference shares of £1. Return dated October 4th, 1940. 500 ordinary shares taken up. £500 paid. Mortgages and charges: Nil.

Atlas Electric & General Trust, Ltd.—Capital £6,500,000 in 3,000,000 preference, 3,000,000 ordinary and 500,000 unclassified shares of £1 each. Return dated July 18th, 1940. 3,000,000 preference and 3,000,000 ordinary shares taken up. £1,749,078 paid. £4,250,922 considered as paid. Mortgages and charges: £750,000.

Buckrose Light & Power Co., Ltd.—Capital £200,000 in 200,000 ordinary shares of £1 each. Return dated July 19th, 1940. 180,000 shares taken up. £180,000 paid. Mortgages and charges: Nil.

Thomasson & Co. (Shrewsbury), Ltd.—Capital £1,000 in £1 shares. Return dated August 8th, 1940. £769 shares taken up. £769 paid. Mortgages and charges: Nil.

Increases of Capital

Mead Electric Co., Ltd.—The nominal capital has been increased by the addition of £500, in £1 shares, beyond the registered capital of £500.

Sigma Electrical Manufacturing Co., Ltd.—The nominal capital has been increased by the addition of £500 in £1 ordinary shares beyond the registered capital of £2,500.

Mortgages and Charges

Turner & Booth, Ltd.—Charge on land and 19, Carlisle Road, Birkdale, Lancs, dated February 6th, 1933 (being property acquired by the company on January 1st, 1941). Amount owing: £600. Registered pursuant to Section 81 of the Companies Act, 1929. Holder: Elizabeth A. Brown, Bodminville, East Beach, Lytham.

Superlamp Ltd.—Mortgage on 83, Ashburnham Road, Bedford, dated February 3rd, 1941, to secure £500. Holder: Mrs. A. E. Morris, 5, Whitehead Avenue, Bedford.

Robert Jenkins & Co., Ltd.—Mortgage and charge on Masborough Boiler Works, Masborough, and the company's undertaking and other property, present and future, including uncalled capital, dated January 31st, 1941, to secure all moneys due or to become due from the company to National Provincial Bank, Ltd.

Liquidations

Synchronous Telegraphs, Ltd.—Particulars of claims by March 31st to Mr. F. J. B. Gardner, liquidator, 94, Old Broad Street, London, E.C.2.

Sunbeam Vacuum Cleaner Co. (1938), Ltd.—Particulars of claims by March 20th to Mr. C. Latham, 185-188, High Holborn, London, W.C.1, or Mr. H. E. Davis, 145, Fleet Road, Fleet, Hants, joint liquidators.

William Garner & Co., Ltd.—Meeting April 9th, at 27-28, Old Jewry, London, E.C.2., to receive an account of the winding-up by the liquidator, Mr. V. W. Bell.

Baxter & Caunter, Ltd.—Meeting March 24th at Balfour House, Finsbury Pavement, E.C.2, to receive an account of the winding-up of the company.

Bankruptcies

H. Truett, electrician, 13, Elmwood Avenue, Baldock, Herts.—This debtor did not attend at the Court House, Luton, recently for his public examination. He had also failed to attend at the Official Receiver's office for his preliminary examination in bankruptcy. No statement of affairs had been submitted and the Official Receiver, having no knowledge of the debtor's affairs, asked for an adjournment of the hearing. The Registrar accordingly ordered the adjournment of the examination.

STOCKS AND SHARES

TUESDAY EVENING.

THE dividend season may be said to have started in earnest. Results for the second half of 1940, and dividends making payments for the full year, are appearing every business day. Their effect upon prices is chiefly noticeable when any striking change occurs between the previous anticipation and the actual figures.

One of the features in the lists this week is a rise of six points in Cable and Wireless ordinary, upon consideration of the fact that the combine will probably declare 4 per cent. dividend next month, payment being, as mentioned here last week, for the full year.

Among the issues in the Home Railway market Southern Railway 5 per cent. preferred ordinary has gone back two points to 45½ and shows a yield of practically 11 per cent. on the money. The company's 5 per cent. preference stock, on a fall of three points to 80½, returns £6 4s. per cent. and is a trustee security. London Passenger Transport issues are in the doldrums, little interest being taken in them.

London Associated Surprise

A surprise in the electric lighting section has been furnished by the London Associated Electricity, a dividend of 4½ per cent. being declared for 1940 against 5½ per cent. for 1939. As, however, no interim dividend was paid six months ago, expectation had looked for either a very small distribution, or for nothing at all in respect of the full year. The company's announcement states that 4 per cent. has been earned, the balance being made up by a transfer from stockholders' reserve. The price of the shares, which previously had been 13s. 9d., has been marked up to 15s. middle.

More Summer Time

The extension of Summer Time by an extra hour, to date from May 3rd to August 9th this year, will arouse inquiry in the minds of the ordinary shareholders of electricity supply companies as to the effect which this may exercise upon the profits of the undertakings. If daylight lasts up to bedtime, and has started again when the hour for rising returns, the companies dealing with electric or gas lighting can scarcely fail to notice a difference. In 1940 most of the former companies, as their interim dividend announcements showed, did reasonably well: their receipts were not materially down on the first half of the year. It was in the second six months of last year that the black-out, evacuation and rising costs made their unpleasant influence felt. The extension of Summer Time, together with the considerations advanced in the previous paragraph, may exercise a distinct influence over profits and dividends. It remains to be seen, of course, whether compensatory conditions will be discovered that will make up for whatever loss of business is occasioned by the forthcoming arrangement.

Price Fluctuations

Lancashire Light and Power ordinary shares have advanced to 30s. on maintenance of the dividend, making 7½ per cent. for the year. British Power and Light, at 25s. 6d., show a fall of 2s., in response to the reduction from 7 per cent. to 6 per cent. in the dividend for the year. The North Wales Power Company, in which British Power and Light is a large holder, has made a similar dividend cut. The 10s. shares stand at 12s. In the Overseas group, Whitehall Investments preference, at 13s., are 1s. 6d. down owing to consideration of the fact that the company has substantial share interests in Greece. The rise of 2s. 6d. to 51s. 3d. in Oriental Telephones is due to an offer, which has just been made by the Indian Government for the purchase at a good price of all the shares of the Bombay Telephone Company. Oriental Telephones have a considerable interest in the Bombay undertaking. Laurence, Scott shares, with a rise to 9s., are 2s. up on the week. Murex regained ⅛ at 78s. 9d. Ericssons are also 2s. 6d. harder at 35s., this being due to the hope that the dividend will once more be paid free of tax. International Combustion shares are 2s. 6d. higher at 90s. Callender's hardened to 63s. 9d. Aron ordinary are 1s. higher at 17s. 4d.

"Met. Electrics"

The Metropolitan Supply Co. has reduced its full dividend for the year from 10 per cent. to 8 per cent., and while this was not unexpected, it caused a fall of 1s. 3d. in the price. For 1937 and 1938 the company paid 12 per cent. In the preceding year in addition to 10 per cent. dividend, there was a special "jubilee" bonus of 2½ per cent. tax free. Prior to that year the ordinary shares had received 10 per cent. annual dividends over a long period.

There is £3,000,000 of the company's ordinary stock in £1 units, authorised and issued, together with £500,000 in 4½ per cent. cumulative preference. The debenture issues come to a little over £2,000,000. The company is one of the largest in its group, its area covering some 320 square miles. The major portion of its power is purchased from the London Power Co. Besides the London areas over which the company supplies electricity, other local authorities take power from the Metropolitan Electric Supply Co. in various parts of Middlesex, Hertfordshire, Surrey, Berks and Bucks. The 4½ per cent. preference shares are quoted at about a guinea, and the 3 per cent. debenture at 83. The last new issue of ordinary shares was made four years ago, when one new share was allotted at 37s. 6d. in respect of each eight old shares held.

City Lights

The City of London Electric Co. which, as mentioned last week, has reduced the usual 7½ per cent. dividend paid for many years past on the ordinary shares, to 7 per cent. in respect of 1940, celebrates its jubilee this year. It was formed in 1891 to supply electricity for all purposes in the City of London and in two parishes in Southwark. It owns the share capital of the Bankside Investment Trust, Ltd., and guarantees the interest and sinking fund of £900,000 of the 5 per cent. first mortgage debenture stock of that company, the price of which is now 104½. In the City of London Electric capital there are 6 per cent. first preference and 8 per cent. second preference stocks, both in £1 units, the prices of which are 27s. and 30s. respectively. The share capital of £2,400,000 is all issued, with the exception of £100,000. The Company's debenture issue amounts to a little over £500,000.

Manufacturing and Equipment

The announcement by the President of the Board of Trade that non-essential factories will be closed down in order to release labour for war work, is not likely to be detrimental to the earnings of the equipment and manufacturing companies. These latter are so busily engaged upon war work, that neither dividends nor turnover are expected to be prejudiced. Companies such as Callender's, British Insulated, Henley's, General Electric, Enfield Cables, Siemens, etc., are being paid for their Government work at a rate which, while it looks modest enough, is reckoned upon turnover, and not upon the capital of the companies. Dividends may not be increased. On the other hand, any sensible diminution in the distributions is not looked for, at any rate so far as the present year is concerned.

Tax-Free Dividends

Shares upon which dividends are paid free of tax have come to the fore owing to the likelihood of income tax being increased in next month's Budget. Amongst the shares in our lists upon which net dividends are paid are Oriental Telephone, Globe Telegraph and Trust ordinary, Calcutta Electric, Ericssons, and Tilling & British Automobile. It does not follow, of course, that because dividends have been paid free of tax in the past, this will be continued indefinitely. Bristol Trams paid its 8 per cent. dividend tax free for 1939, but for 1940 the dividend, recently declared, was 8 per cent. less tax.

Net and Gross

For how long the present rate of income tax at 8s. 6d. in the £ is going to remain, only the Chancellor of the Exchequer is in a position to say. It may be of service, however, to set out, by way of guide, the relative rates when a dividend is paid free of tax, with the equivalent gross amount, taking tax at 8s. 6d. in the £. The following six examples will enable calculation to be made of practically any rate which it is required to ascertain:

Free of tax at 8/6 in the £	*Equivalent Gross*
£ s. d.	£ s. d.
3 10 0	6 1 9
4 0 0	6 19 1
4 10 0	7 16 5
5 0 0	8 13 10
5 10 0	9 11 1
6 0 0	10 8 8

ELECTRICAL COMPANIES' SHARES

Prices, Dividends and Yields

Company	1940 High-est	1940 Low-est	Dividend Pre-vious	Dividend Last	Middle Price March 10	Rise or Fall	Yield p.c. £ s. d.
Home Electricity Companies							
Bournemouth and Poole	63/6	36/6	15	12½	47/6	..	5 5 3
British Power and Light	30/-	20/-	7	6	25/-	−2/-	4 14 1
City of London	28/-	20/-	7¼	7	20/-xd.	−9d.	7 0 0
Clyde Valley	38/6	24/-	8	8	35/-	..	4 11 5
County of London	43/3	21/-	10½	8	30/-xd.	−½	5 6 8
Edmundson's:							
7% Pref.	32/-	24/3	7	7	28/3	..	4 19 1
Ord.	27/6	18/6	9	6	24/6	..	4 18 0
Elec. Dis. Yorkshire	40/3	32/-	9	9	36/3	..	4 19 4
Elec. Fin. and Securities	42/-	34/6	12½	12½	40/-	..	6 5 0
Elec. Supply Corporation	48/-	39/-	12	11½	37/-	..	6 4 4
Isle of Thanet	16/-	5/6	4	4	7/-	..	—
Lancs Light and Power	33/-	21/6	7¼	7½	30/-	+⅛	5 0 0
Llanelly Elec.	21/-	17/-	5½	5½	20/-	..	5 10 0
Lond. Assoc. Electric	21/-	12/6	5½	4½	15/-	+¼	6 0 0
London Electric	35/-	19/-	7	7	22/6	..	6 4 5
London Power Deb. Red	105½	100	5	5	102½xd.	..	4 17 6
Metropolitan	41/6	22/6	10	8	32/-xd.	−⅛	5 0 0
Midland Counties	39/-	23/3	8	8	34/6xd.	+9d.	4 12 10
Mid. Elec. Power	40/-	29/6	9	9	33/9	..	5 6 8
Newcastle Elec.	29/9	22/6	7	7	25/-	..	5 12 0
North Eastern Elec.:							
Ordinary	31/6	16/6	7	7	27/-	..	5 3 9
7% Pref.	32/6	25/6	7	7	30/-	..	4 13 4
Northampton	44/-	38/-	10	10	40/-	..	5 0 0
Notting Hill 6% Pref. (£10)	10½	9	6	6	8½	..	—
Northmet Power:							
Ordinary	42/3	22/6	10	7	28/9xd.	−9d.	4 17 4
6% Pref.	29/-	23/-	6	6	28/6	..	4 4 3
Richmond Elec.	24/6	18/-	6	6	18/9	..	6 8 0
Scottish Power	38/-	24/-	8	8	35/-	+6d.	4 11 5
Southern Areas	21/3	12/9	5	5	16/3	..	6 3 1
South London	23/3	20/-	7	7	20/-xd.	+6d.	7 0 0
West Devon	20/-	17/6	5	5	20/-	..	5 0 0
West Glos.	22/-	15/-	2½	4½	16/3	..	5 10 10
Yorkshire Elec.	40/-	23/6	8	8	36/3	..	4 8 5
Overseas Electricity Companies							
Atlas Elec.	4/-	1/3	Nil	Nil	2/-	..	—
Calcutta Elec.	37/-	22/6	10*	8*	35/-	..	4 11 5
Cawnpore Elec.	30/-	24/-	10	10	27/6	..	7 5 6
East African Power	25/6	19/6	7	7	25/-	..	5 12 0
Jerusalem Elec.	24/-	15/-	7	7	21/3	..	6 11 9
Kalgoorlie (10/-)	12/6	9/6	7½	7½	12/-	..	6 5 0
Madras	26/9	21/6	8*	6*	25/-	..	—
Montreal Power	35½	30	1½	1½	28½	..	5 5 3
Palestine Elec. "A"	25/-	10/-	5*	Nil	18/9	−⅛	—
Perak Hydro-electric	20/3	13/-	2½	6	17/6	+6d.	6 17 2
Shawinigan Power	27½	19	83cts.	90cts.	18½	..	—
Tokyo Elec. 6%	69	30	6	6	38½	..	15 11 8
Victoria Falls Power	75/9	56/6	15	15	75/-	..	4 0 0
Whitehall Investments Pref.	17/9	8/-	7½	7½	13/-	−⅛	11 10 10
Public Boards							
Central Electricity							
1950-70	110½	104	5	5	109	..	4 11 9
1955-75	112½	106	5	5	110xd.	..	4 11 0
1951-73	107½	102	4½	4½	107	..	4 4 0
1963-93	96½	90	3½	3½	97	+1	3 12 2
1974-94	91	79½	3½	3½	89	..	3 13 0
London Elec. Trans. Ltd.	92	87½	2½	2½	93	..	2 15 9
London & Home Counties							
1955-75	113½	105	4½	4½	105½	..	4 5 4
Lond. Passenger Transport							
A	116	104	4½	4½	111½	..	4 0 9
B	116	102½	5	5	106	..	4 14 4
C	65½	25	1½	3	34	..	8 16 6
West Midland Joint Elec.							
1948-68	106½	103	5	5	105½xd.	+1½	4 14 9
Telegraph and Telephone							
Anglo-Am. Tel.:							
Pref.	107	85	6	6	100½	..	5 19 3
Def.	23½	18	1½	1½	23½	..	6 7 8
Anglo-Portuguese	22/6	10/-	8	8	15/-	..	10 13 4
Cable & Wireless:							
5½% Pref.	99½	66	4½	5½	97½	+2	5 12 10
Ord.	65	27	4	4	61	+6	—
Canadian Marconi $1	6/-	4/-	Nil	4cts.	5/-	..	6 11 2
Globe Tel. & Tel.:							
Ord.	32/6	21/6	7½*	6*	27/6xd.	+3d.	4 7 3
Pref.	27/9	22/6	6	6	27/6xd.	+9d.	4 7 3
Great Northern Tel. (£10)	20	11	20	20	12½	..	—
Inter. Tel. & Tel.	5½	2½	Nil	Nil	3	..	—
Marconi-Marine	30/-	18/3	10	7½	22/6		6 13 3
Oriental Telephone Ord.	2⅞	45/-	12*	11½*	2 7/16	+⅛	4 10 0
Telephone Props.	15/-	11/-	6	6	11/3	..	10 13 4
Telephone Rentals (5/-)	9/6	5/3	10	10	7/3	..	6 18 0

Company	1940 High-est	1940 Low-est	Dividend Pre-vious	Dividend Last	Middle Price March 10	Rise or Fall	Yield p.c. £ s. d.
Traction and Transport							
Anglo. Arg. Trans:							
First. Pref. (£5)	4/3	1/-	Nil	Nil	2/-	..	—
4% Inc.	11½	2	Nil	Nil	6¼	..	—
British Electric Traction:							
Def. Ord.	830	400	5	45	800	..	5 12 6
Pref. Ord.	169	130	8	8	150	..	5 6 8
Bristol Trams	48/6	32/6	8*	8	35/-	..	4 11 5
Brazil Traction	12½	5½	$1	50c.	7	..	—
Calcutta Trams	24/-	16/3	8	5½	19/-	..	5 15 8
Cape Elec. Trams	18/6	16/-	5	5	17/-	..	5 17 4
Lancs Transport	35/-	27/6	10	10	35/-	..	5 14 3
Mexican Light:							
1st Bonds	36	25	5	5	35	..	—
Rio 5% Bonds	95	74	5	5	85	..	5 17 8
Southern Rly.:							
5% Prefd.	79	35	5	5	45½	−2	10 19 9
5% Pref.	104½	59	5	5	80½	−3	6 4 3
T. Tilling	45/9	29/-	10	10	41/3	..	4 17 0
Tilling & B.A.	47/6	41/9	9*	8*	44/6	..	—
West Riding	35/-	25/-	10	10	35/-	..	5 14 3
Equipment and Manufacturing							
Aron Electricity Ord.	17/6	10/-	15	Nil	17/-	+1/-	—
Assoc. Elec.							
Ord.	43/3	26/6	10	10	40/-	..	5 0 0
Pref.	36/6	32/3	8	8	35/-	..	4 11 5
Automatic Telephone & El.	47/3	32/-	12½	12½	43/9	..	5 14 1
Babcock & Wilcox	50/-	28/6	10	11	40/9	+9d.	5 8 0
British Aluminium Ord.	56/-	29/-	12½	12½	40/9	..	—
British Insulated Ord.	92/6	67/-	20	20	80/-	..	5 0 0
British Thermostat (5/-)	14/9	6/6	18½	18½	11/3	..	8 4 6
British Vacuum Cleaner (5/-)	12/-	4/9	40	12½	6/3	..	10 0 0
Brush Ord.	4/6	1/9	Nil	Nil	4/-	..	—
Callender's	69/-	46/-	15	15	63/9	+⅛	4 13 9
Chloride Elec. Storage	72/6	55/-	15	15	62/6	..	4 16 0
Consolidated Signal	72/6	59/-	17	17	65/-	..	5 4 7
Crabtree (10/-)	24/9	17/6	17½	17½	22/6	..	7 15 7
Crompton Parkinson:							
Ord. (5/-)	20/-	12/-	30	20	18/9	..	5 6 8
E. K. Cole (5/-)	5/-	2/6	10	Nil	4/-	..	—
Elec. & Musical Industries							
(10/-)	10/3	4/3	5	Nil	7/6	..	—
Electric Construction	36/3	27/6	13½	10	27/6	..	7 5 6
Enfield Cable Ord.	56/-	40/6	25	16½	50/-	..	6 10 0
Electrical Switchgear (10/-)	22/6	20/-	16	10	20/-	..	5 0 0
English Electric	33/9	16/6	10	10	30/-	..	6 13 4
Ensign Lamps (5/-)	15/3	12/6	25	25	15/-	..	8 6 3
Ericsson Tel. (5/-)	39/3	23/-	25*	25*	35/-	+½	—
Ever Ready (5/-)	28/3	16/6	30	40	26/-	..	7 14 0
Falk Stadelmann	18/3	12/6	6	7	15/9	..	8 17 10
Ferranti Pref.	25/-	22/-	7	7	25/-	..	5 12 0
G.E.C.:							
Pref.	32/6	26/-	6½	6½	32/6	..	4 0 0
Ord.	83/3	53/3	20	20	78/9	..	5 1 6
Greenwood & Batley	25/6	20/-	15	13	20/-	..	13 0 0
Hall Telephone (10/-)	18/6	8/9	15	10	10/-	..	10 0 0
Henley's (5/-)	21/6	12/6	20	20	20/-	..	5 0 0
4½% Pref.	21/2	20/6	4½	4½	21/3	..	4 4 8
Hopkinsons	46/9	32/6	15	15	38/9	..	7 14 8
India-Rubber Pref.	21/-	19/6	5½	5½	21/3	..	5 3 6
Intl. Combustion	121/3	70/-	32½	30	90/-	+½	6 13 4
J. Lucas	60/6	40/-	15	15	55/-	..	5 9 1
Johnson & Phillips	50/9	32/6	12½	15	45/-	..	6 13 4
Lancashire Dynamo	59/9	47/6	25	20	52/6	..	7 12 4
Laurence Scott (5/-)	11/-	6/-	15	15	9/-	+2/-	8 6 8
London Elec. Wire	25/6	20/-	7½	7½	22/-	..	6 13 4
Mather & Platt	46/6	30/-	13½	10	37/-	−6d.	5 8 1
Metropolitan Elec.Cable Pf.	22/-	21/3	5½	5½	21/3	..	5 3 6
Murex	86/9	52/6	20	20	78/9	+½	5 1 8
Pye Deferred (5/-)	9/-	6/9	25	25	10/-	..	14 5 8
Revo (10/-)	20/9	11/6	17½	5	20/-	..	2 10 0
Revrolle	60/6	41/-	12½	12½	50/-	..	5 0 0
Siemens Ord.	23/9	15/6	7½	7½	20/-	..	7 10 0
Strand Elec. (5/-)	2/3	9d.	4	2	1/9	..	5 14 4
S. Smith (1/-)	8/-	3/6	37½	50	6/3	..	8 0 0
Switchgear & Cowans (5/-)	11/9	5/6	20	10	8/9	..	5 14 3
Telegraph Condenser (10/-)	8/9	6/3	5	..	7/6	..	—
Telegraph Construction	42/6	29/-	10	10	36/3	..	5 10 6
Telephone Mfg. (5/-)	9/-	5/-	9	9	7/-	..	6 8 7
Tube Investments	96/9	59/-	23½	23½	90/-	..	5 5 9
Vactric (5/-)	3/6	2/-	4	Nil	2/3	..	—
Vickers (10/-)	22/-	9/6	10	10	15/-	..	6 13 4
Ward & Goldstone (5/-)	19/6	12/6	20	20	13/9	..	7 5 6
Westinghouse Brake	46/-	30/6	17½	10	40/-	..	5 0 0
Walsall Conduits (4/-)	26/6	17/6	55	55	26/3	..	8 7 6
West, Allen (5/-)	7/-	3/-	10½	7½	3/9	..	10 0 0

*Dividends are paid free of Income Tax.

CONTRACT INFORMATION

Tenders Invited and Accepted. Schemes Promising Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses. Further details of items marked with an asterisk can be obtained from the Department of Overseas Trade (Inquiry Room), Millbank, Westminster, London, S.W.1.

Birkenhead. — March 17th. Corporation. Power transformers over a period of either 6 or 12 months commencing April 1st, 1941. Specifications and form of tender from the borough electrical engineer, Craven Street.

Bury.—March 17th. Electricity Department. Five 625-kVA transformers. (February 28th.)

Maidenhead. — March 31st. Borough Council. Pumping machinery to deal with crude sewage at three automatic electrically operated pumping stations. Particulars and forms of tender from Howard Humphreys & Son, consulting engineers, 7, Eldon Square, Reading, Berks, by March 17th. (Deposit £2 2s.) Tenders to H. E. Davies, Town Clerk, Guildhall.

North Riding.—EDUCATION COMMITTEE.—Electric heating and lighting of school shelters at Eston, Guisborough, Loftus, Northallerton, Redcar, Richmond, Saltburn and Skelton. Plans by the County Architect, County Hall, Northallerton.

South Africa.—PRETORIA.—March 26th. City Council. Switchgear, transformers, reactors and auxiliary apparatus. (February 14th.)

April 2nd. City Council. Pipework equipment for the power station. (February 21st.)

April 10th. Union Tender and Supplies Board. Electric cooking apparatus, refrigerator, etc., for the Police Station, Springs. (T.15949/41.)*

CAPE TOWN.—March 31st. Electricity Department. 2,000 fuses. (T.15821/41.)* Ironclad service cut-outs. (T.15820/41.)*

April 15th. 100 AC electricity meters. (T.15985/41.)*

JOHANNESBURG.—April 7th. City Electricity Department. Automatic fire-fighting equipment for switchgear and transformers. (T.15847/41.)*

April 15th. Railways and Harbours Administration. Automobile batteries. (T.15961/41.)*

Southport.—March 25th. Electricity Department. Oil cooled static transformers. (See this issue.)

Twrcelyn (Anglesey). — March 20th. R.D.C. Various waterworks, including pumping and purification plant (contract 3). Specification and form of tender from Henry Adams & Son, consulting engineers, Fron Heulog, Bangor. (Deposit: £1).

Wolverhampton.—March 17th. Electricity Department. Paper insulated cables, compound and compounded insulating tapes. (February 7th.)

Orders Placed

Barrow-in-Furness. — Electricity Committee. Accepted. 3-panel 6,600-V switchboard (£1,090).—B.T.H. Co. 4-panel 6,600-V transformer kiosk (£870), 7-panel 11,000-V switchboard (£3,918), and feeder panel (£462).—Metropolitan-Vickers Electrical Co. 600-kVA transformer (£387). — British Electric Transformer Co. Feeder unit (£279), and 6-panel switchboard (£1,623).—Ferguson, Pailin.

Birkenhead.—Electricity Committee. Accepted. 5,000 kVA transformer.—Ferranti. Switchgear.—G.E.C. Two switch units.—A. Reyrolle & Co. E.h.v. switchgear for leather works (£936).—Crompton Parkinson. Two transformer equipments and five feeder units (£272).—W. Lucy & Co.

Blackburn.—Town Council. Accepted. High temperature steam pipe work (£11,370).—Babcock & Wilcox.

Dundee.—Public Health Committee. Accepted. Electric dough mixer and mincer for Westgreen Mental Hospital (£323).—D. H. Crabb.

Essex.—C. C. Highways Committee. Accepted. Re-wiring machinery at Canvey Island bridge (£282).—Electrical Installations.

Manchester.—Transport Committee. Accepted. Six miles cadmium copper trolley wire.—R. Johnson & Nephew. Overhead equipment material.—B. I. Cables; Ellor, Johnson, & Russell.

Sheffield.—Transport Committee. Accepted. Double tramway junctions (£3,192).—Hadfields.

Electricity Committee. Accepted. Coal handling plant.—Mitchell Engineering.

South Africa.—Union Tenders & Supplies Board. Accepted. Switchboard cables.—Siemens Bros. & Co. (British), Ltd. (£917); British Insulated Cables (S.A.), Ltd. (£33,502); Standard Telephones & Cables, Ltd. (£16,329); Henley's (S.A.) Telegraph Works Co., Ltd. (£5,550); Stratford Engineering, Ltd. (£1,847).

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Blayden.—Bedding factory; Northern Bedding Co.

Bootle.—Alterations to works; Hughes and Stirling, builders, 4, Brasenose Street, Bootle, Liverpool.

Carmarthen.—Reinstatement and repair of Wesley Methodist Chapel, for trustees; A. J. Davies, steward, Heol-y-delyn, Carmarthen.

Chesterfield.—Plaster room and Matron's Office; secretary, Chesterfield Royal Hospital, Newbold Road.

Chipping Norton.—Water scheme (£14,300) for T.C.; borough engineer.

Cumberland.—School shelters (£27,500), for E. C.; J. H. Haughan, county architect, Alfred Street North, Carlisle.

Dublin.—New administration block and men's messroom at McKee Barracks, for Commissioners of Public Works; J. P. Fagan, secretary, Office of Public Works.

Erection of a station at Kimmage, for Commissioners of Public Works; G. P. Fagan, secretary, Office of Public Works.

Dunmanway.—Erection and completion of vocational schools, for County Cork E. C.; E. P. O'Flynn, architect, 60, South Mall, Cork.

Eccles.—Additions to works; Heath's (Eccles) Ltd., contractors, Cawdor Street, Patricroft.

Frome.—Pumping plant at sewage works (£1,610), for U.D.C.; surveyor, Christchurch Street.

Heaton Mersey.—Re-building "Dog and Partridge" Hotel, Didsbury Road; Boddington's Breweries, Ltd., Strangeways Brewery, Bridge Street, Manchester.

Keighley.—Flats, Greenhead Drive; Mary Laycock.

Kenilworth.—Control centre; Warwickshire county architect.

King's Lynn.—Restoration of All Saints' School, for E.C.; town clerk, Municipal Buildings.

Lichfield.—Eight houses at Mavesyn Ridware for R.D.C.; J. G. Rimand, surveyor, Rural Council House.

London.—Rest centre equipment (£75,000).—L.C.C. architect.

Manchester.—Laboratory block; R. & T. Howarth, contractors, Crossfield Works, Rochdale.

Mansfield.—Offices, Sutton Road; Quortex, Ltd.

Additions to works; W. Couborough, furnisher, Nottingham Road.

Moorthorpe.—Church (£5,000); Rev. H. Milner, The Vicarage, South Elmsall, Pontefract.

Ripley. — Improvements to operating theatre at Hospital for Board of Management; G. A. Wheatley, contractor.

Salford.—Re-building work at Regent Road Brewery for Groves & Whitnall, Ltd.; T. Campion & Son, building contractors, Devonshire Street, Ardwick, Manchester 12.

Conversion of Grecian Road school to hospital (£8,600); borough engineer.

Sheffield.—Repair works (£200,000); city architect.

Slaithwaite.—Extensions to the Town Hall for Colne Valley U.D.C.; A. Shaw, architect, 59, Knowle Road, Golcar, Huddersfield.

Stirlingshire.—Air-raid shelters at schools (£14,000) for C.C.; County Council architect, Stirling.

Stoneycroft. — Re-building the "St. George's" Hotel, Green Lane; Peter Walker and Sons, Warrington and Burton, Ltd., brewers, 105, Duke Street, Liverpool.

Sutton-cum-Duckmanton.—School buildings for Derbyshire Education Committee; J. Harrison, county architect, County Offices, St. Mary's Gate, Derby.

Swansea.—Waterworks (£22,000); water engineer.

Tynemouth. — Conversion of premises, Hudleston Street into flats for Weir & Son; E. C. Leighton, builder, 250, Broadway, Cullercoats, Whitley Bay.

Municipal cafés in Front Street, Cullercoats, West End and East End for the T.C.; borough engineer, 19 Howard Street, North Shields.

Wallasey.—Extensions, Central fire station (£7,499); J. Tomkinson & Co., Ltd.

Wolverhampton.—Buildings at salvage depot for T.C.; Timmins and Davis, builders, 181, Park Street.